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No. 6

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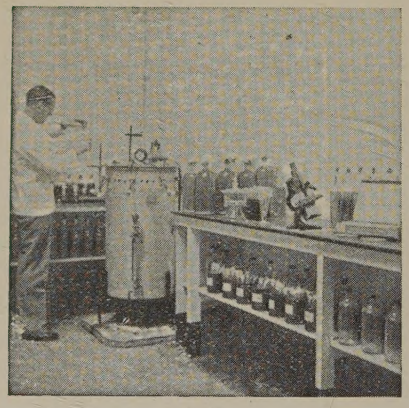

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The New Zealand Journal of Agriculture

Published by direction of the Hon. W. LEE MARTIN, Minister of Agriculture.

Vol. 61 WELLINGTON, DECEMBER 16, 1940. No. 6

There's A Gap To Fill In Pig Production

By M. J. SCOTT,
Superintendent of the Pig Industry, Wellington.

FARMERS are to be congratulated in their achievement in producing last year about 6,500 tons of bacon and pork more than they produced in the same period for the year ended September, 1939. This achievement is particularly commendable for two reasons, first, because everything pointed in September, 1939, to a production of at least 2,500 tons less than the year before (the slaughterings for 1939-40 were 50,000 less than for 1938-39), and secondly, because they had to change over from pork to bacon at short notice and so had no opportunity of providing extra feed.

Extra Home-grown Feed Used

They did actually produce the extra feed, however, in spite of the short notice. Some may be inclined to think that the extra production arose from purchased meals, but this can hardly be the case. As it takes six tons of feed to produce one ton of meat, the extra production this year used at least 40,000 tons of feed more than the year before. It is almost a certainty that the increase in meals used was nothing like 40,000 tons. There was an actual drop in imports, which were approximately 6,000 tons less than those of 1940, and, judging by stocks now on hand, there is no reason to believe that there was any increase in local meal supplies used for pig feeding. About half the 40,000 tons increase may have been due to dairy by-products, but the bulk of the remainder appears to have been home-grown crops.

It is an achievement of considerable merit to grow and convert such a quantity of feed into pig meat within one year.

Various motives may be read into what has just been written, but it is not an attempt to prepare the way for a shortage of meals this year. Every effort is being made to ensure an adequate supply of meals, and prospects are satisfactory. It is intended, however, to stress once again the real importance of home-grown crops in any programme of increased production. Meals are indispensible in small countries in getting free value out of paddock crops, but 90 per cent. of any increase in pig production must come from paddock crops.

Prospects For 1941

The prospects for the increase of 10,000 tons of export for 1941 are bright.

Farmers have had time to breed the extra pigs and grow the extra crops. In the first five weeks of the killing season there is already an increase of more than 1,000 tons of bacon over the killings of the previous year. Reports to hand from most localities indicate an increase in the number of weaners

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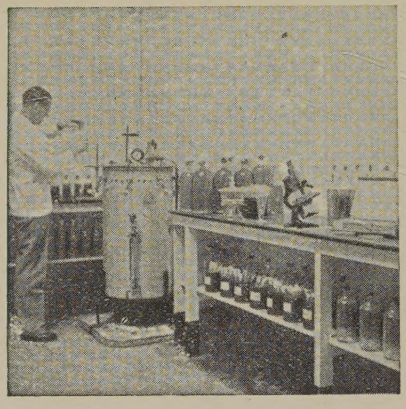

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and suckers on hand through the winter, and in spite of the fact that the early flush of milk supply makes it appear that pigs were in short supply, there are a number of indications that the increased quantity of export bacon will materialise.

Improved Housing

One of the most noticeable features of the pig business is the continued increase in the number of new houses that are being built. As a result of their experiences in the peak years of production in 1936-38 farmers have realised the futility of trying to produce pigs without the necessary conveniences, and are now putting the pig business on a sounder footing. Good housing gives satisfaction and self-respect to the owner, and it allows pigs to show what they are really capable of doing.

Approximately one-quarter of our feed supply was wasted through bad housing, and three-quarters of the causes of rejection and condemnation could be avoided by better houses. It is pleasing to note the remarkable drop in rejections at the works over the last four or five years. This is mainly due to better housing, and will be referred to in detail in a later issue of the "Journal."

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It is unnecessary to stress the opportunity for increased production of pigs presented to us by the defection of European countries that previously provided Great Britain with the major portion of her imported bacon. Canada last year doubled up her output, and as recently announced, has secured a contract for further increased supplies.

Our produce is acceptable without question by Great Britain; we are invited to step up our production; all that remains is for farmers to give thought to the subject and get busy.

Thought could well be given to the use that farmers are making of grading—they have not taken full advantage of grading to improve pigs—and to the question of further increased production. It is better to make preparation now for increased production than to be forced into finding excuses for having "missed the bus" in a few years' time.

Bloat
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THE Director-General's PAGE

Linen Flax

Before the present conflict Britain used 60,000 tons of linen flax fibre, and of this total 54,000 tons were imported. The bulk of these imports came from the Baltic countries—namely, Russia with 16,000 tons, Latvia 14,000 tons, and Estonia 2,000 tons. Belgium supplied 15,000 tons. The Russian supply ceased some time before the war began, and everyone knows the fate of the other supplying countries.

After the elimination of the Belgian supply the Home Government set out to find alternate sources in the Dominions, and requested New Zealand to produce 3,000 tons of fibre, which meant the sowing of 14,000 acres. Five hundred tons of linen flax seed were immediately shipped to New Zealand, and this, together with a quantity of our own grown seed, will be sufficient for the sowing out of the area, the bulk of which is already drilled.

England herself intends to produce 3,200 tons of fibre, and with the help of Ireland with 5,200 tons, Canada with 6,000 tons and Australia with 4,400 tons, will be able to produce 21,800 tons, which is a third of her normal PEACE TIME requirements.

Mechanical pullers for harvesting the crop are being constructed in this country, as are machines for de-seeding the straw. The processing of the straw will take place in 11 factories, situated at Blenheim, Waikuku, Oxford, Leeston, Methven, Washdyke, Makikihi, Balclutha, Tapanui, Winton and Otautau. These will deal with the crops grown in the various districts. In these factories processing will be carried out in three different ways, namely, tank retting, dew retting, and dry decortication. These processes will leave the fibre in a condition to be exported for final manufacture in England.

Thus it will be seen that New Zealand is playing her part in the production of an essential war commodity, and it is hoped that in doing so we will establish a permanent industry which will assist in the diversification of our farming industry.

Control of Noxious Weeds

BEGINNING with the year 1936-37 and continuing each successive year to the present year (1940-41), the Government introduced a liberal scheme of financial assistance to County Councils which were prepared to carry out comprehensive work on ragwort or other noxious weeds control on lands within their respective areas.

For the first two years the scheme was worked in co-operation with the Labour Department, which made available to the Department of Agriculture a sum of money for subsidising labour under the scheme, the Department of Agriculture providing the remainder of the money required. Under the present scheme the Department of Agriculture provides the whole of the wages, material and transport employed on the work, and the respective County Councils organise the work and provide the internal administration. The local Inspectors of the Livestock Division work in full co-operation with the county officials, and approve of all work undertaken.

While the scheme was evolved to deal with the spread of ragwort in particular, work on other noxious weeds, especially blackberry, has also been approved under the scheme. Counties desiring to take advantage of the scheme make application to the Department for an allocation of a sum of money for work within the county, and, on being advised of the allocation and the conditions, the county makes the necessary arrangements and bears the initial cost of labour, sodium chlorate, or Atlacide, and as work proceeds refunds of expenditure are arranged for as required. In all, 41 counties have carried out operations under the scheme at an average annual net cost of approximately £60,000.

In addition to work carried out on Crown and Native lands, assistance in whole or part is given for approved work on private lands.

County councils have expressed the opinion that the work has been well worth while, and it is admitted that but for the scheme large areas would undoubtedly have gone out of production.

* * *

Bull Fertility Testing Service

DAIRY farmers have not been slow in taking advantage of the service initiated at Ruakura for testing the fertility of bulls. Since the article describing this service appeared in the September number of the "Journal," 100 samples of semen have been received at Ruakura from bulls distributed widely throughout both Islands. It seems certain that this service is destined to play a very real part in assisting dairy farmers in combating sterility in their herds.

This year, artificial insemination is being used entirely in one of the Ruakura herds. Some valuable information is being obtained concerning the methods which will have to be used in adapting this procedure to New Zealand conditions. In addition, the experiment appears likely to assist in determining the effects of various various methods of feeding and handling the bull on his fertility.

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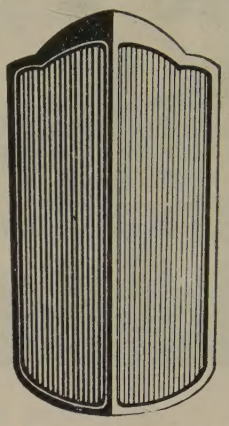

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Lime Is a Corner Stone of Increased Production

"To obtain the greatest value from fertilisers, the lime content of the soil should be adequate," states the author of this article. In non-technical language he discusses the place of lime in agriculture, its effects on the soil and the different forms in which it is available to the farmer.

How It Can Best Be Used On The Farm

By M. M. BURNS,
Lecturer, Canterbury Agricultural College.

Fig. 1.—A typical outcrop of limestone near Whangarei.
[*Tourist Dept., photo.*

MORE than 2,000 years ago the Romans knew that lime increased the productiveness of many soils, and today lime is becoming more and more widely used throughout this country. But lime has not always been appreciated; its use has in fact been alternately praised and condemned throughout the development of the arts of farming.

We read of the 17th Century practice of "chalking" the land, when tons of lime were laboriously spread in heavy dressings over quite considerable areas, and along with these descriptions are frequent references to the benefits to the land and crop which followed.

Later came the reaction when the initial increased production brought about by the lime began to fall off through—as we now know—the extra draft made upon the other plant foods of the soil, and the views of the farmers of this period are recalled in the familiar old saying:

"Lime enriches the father,
Impoverishes the son."

But this view is only half a truth, for adequate liming, coupled with the use of fertilisers and good seed, can enrich both the father and the son.

Fig. 2.—Red clover requires plenty of lime. The passage of the topdresser to and from the dray is shown distinctly.
[*R. C. Beck, photo.*

Now that the value of liming is becoming more widely recognised it seems desirable to draw more attention to lime itself. In everyday language the word "lime" may mean any one of a number of substances which are sometimes used for soil improvement, and "liming" means the application of one or more of these materials on the soil. In agriculture, lime usually refers to ground limestone rock.

Origin of Lime

Nearly all natural waters contain lime which has been dissolved out of the rocks or soil through which the water has passed. In this way the rocks and soil gradually lose their lime, which is washed down into drainage basins or out to sea, where it is either deposited through chemical changes or it is taken up by shell fish and minute organisms to be used in building up their protective coverings. When these organisms die their shells fall to the sea floor where, over thousands of years, they accumulate to produce great beds of limestone.

Some of these beds consist almost entirely of the shell cases of minute organisms, and these produce the "chalks" while the larger shell cases produce the "shell" limes. Other beds are cemented together by iron compounds and/or lime itself to produce the hard and soft limestones, whereas

beds which have been subjected to great pressure may actually be changed to marble, the hardest and purest form of lime.

Then, again, as lime is deposited under the sea, the commonest impurities are sand and mud; low-grade limestones containing much clay and sand are often referred to as "papa," and those containing mud as "marls."

Different forms of lime are extensively used in industry, as well as in agriculture. The soft limestones are used to prepare whiting, the hard limestone and marble for building stone and facings, and after burning, for preparation of mortar, while the limestone marls are used as a basis for cement.

How Soils Lose Lime

Soils in all regions where the rainfall is greater than the evaporation tend to lose lime and to become sour or acid, or if already sour to become still more so.

Rain water contains some acid which, together with that developing as a result in the decay of the organic matter, dissolves lime, magnesia, and similar materials from the rocks and soil through which it percolates. These are lost in the drainage, the amount being greatest under conditions of free drainage and high rainfall.

Although the amounts of lime lost in this way under New Zealand conditions have not been measured, results from similar soils overseas under a 30-inch rainfall show that these losses would be equivalent to about 300 to 500 lb. of limestone per acre per year. On this basis, approximately one ton of limestone per acre or its equivalent in other forms of lime will be needed every four to six years to make good the drainage loss of lime under this rainfall. For districts with higher rainfall, the amounts required would be still greater.

Perhaps the most striking illustration of the loss of lime through leaching by drainage is shown on the limestone country itself, for here it is not unusual for the top soil to have lost so much lime that it is quite acid.

All agricultural crops absorb lime, so that the soil is gradually depleted of this material by the growing of crops and grazing of animals. However, the amount of lime thus carried away is small compared with that lost in the drainage. Some fertilisers, such as nitrate of soda and sulphate of ammonia, tend to increase the loss of lime slightly, while others, such as basic slag and blood and bone, tend to increase the supply.

Soils Which Need Lime

Soils deficient in lime are frequently called sour or acid. Sour clay soils are usually heavy, slow-draining and sticky when wet, while the lighter

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stony soils which are sour are readily distinguished by the dominance of hair-grass, sweet vernal, and sorrel in the pastures. Careful observation of the kind and the condition of the vegetation often furnishes valuable information on the lime status of the soil.

Certain plants, such as lucerne, red clover, mangolds, and barley, make strong growth only on soils that are well supplied with lime. White clover, wheat, and ryegrass make good growth on soils which contain insufficient lime for lucerne or red clover. Oats, potatoes, and lupins will grow fairly well on soils that are very low in lime and unsuitable for the crops already mentioned. Certain weeds, such as spurrey, sorrel, sweet vernal, hawkbit, and flat weeds, are also tolerant of very sour conditions, but their presence in large numbers may also result from an impoverished condition of the soil.

In the classification below the crops which require most lime in the soil for strong growth are placed towards the head of each list. Those below have progressively greater tolerance of acidity, and those near the end of each list make good growth on sour soils. Even so, they may still respond to liming.

Relative Lime Needs of General Crops.

Legumes.	Cereals.	Roots.	Grasses and Weeds.
Lucerne	Barley	Sugar beets	Ryegrass
Red clover	Maize	Swedes	Poas
White „	Wheat	Mangolds	Fescues
Vetches	Oats	Turnips	Cocksfoot
Peas	Rye	Carrots	Spurrey
Lupins		Potatoes	Sweet vernal

Fig. 3.—**Poor, open pastures full of weeds and with little clover usually indicate soil impoverishment and a deficiency of lime.**

[W. W. Dunsterville, photo.

Effect of Lime On the Soil

When lime is added to sour soils it brings about an improvement of the soils and an increase in the yields of crops. These changes may be physical, chemical, or biological.

Physical Effects.—Heavy clay soils are made more crumbly, easier to cultivate, less sticky, better drained, and more suitable for plant growth when heavy dressings of lime are applied. Lime is a soil-improver, not a fertiliser. Therefore, the increased growth induced by lime will result in a heavier drain on the other soil materials. This should be balanced by the use of fertilisers.

Chemical Effects.—Apart from adding calcium, which is a plant food, to the soil, liming brings about chemical changes which are commonly called "sweetening." Soil acids are neutralised and harmful conditions associated with these acids are avoided. Lime also increases the efficiency of fertilisers by fixing the phosphate in a soluble form and by promoting the breakdown of the organic matter.

Biological.—The beneficial soil bacteria do more work in soils that contain lime or in those which have a low acidity, either naturally or as a result of liming, than they do in rather sour soils. On the other hand, some undesirable organisms of the soil are favoured by plenty of lime. Such is the fungus which causes potato scab. This potato disease is much less injurious in an acid soil. Excessive lime encourages "root rot" of tobacco, but it reduces markedly the activity of the fungus of the "club root" disease of brassicas.

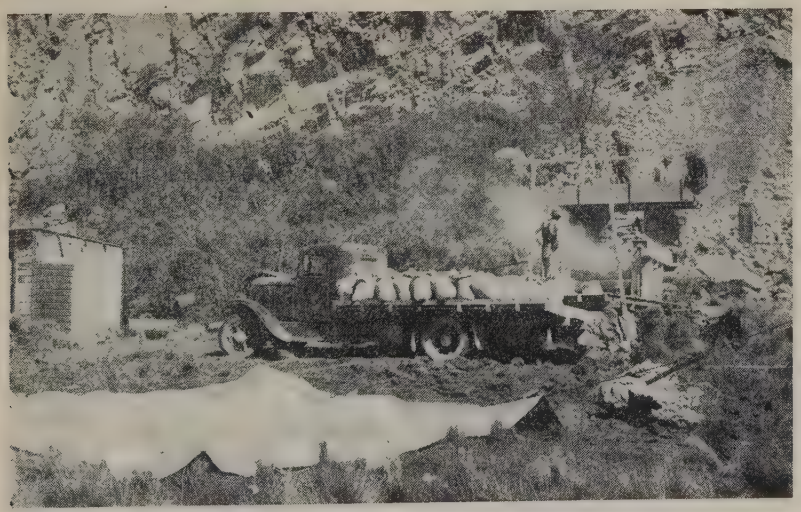

Fig. 4.—**A portable lime crusher working on an exposed face. These crushers are of great value in districts not well served by rail.**

[R. C. Beck, photo.

Forms of Lime In Agriculture

There are two main forms of lime available in this country for use on the soil. These are:—

(1) Carbonates (chemically, calcium carbonate).

(2) Burnt, caustic or quick-lime (chemically, calcium oxide).

The carbonate form is found naturally as marble, limestone rock, marl (which is a soft limestone, mixed with silt and clay) and shells. Ground limestone rock is by far the commonest form of these used in New Zealand, as it is easier to handle and does not burst the bags or spoil when stored or wetted, as does burnt lime.

Colour Unimportant

The effectiveness of ground limestone which varies from nearly white to yellowish gray or deep brown, is unimportant, and cannot be taken as a measure of purity.

The effectiveness of ground limestone in correcting the acidity of soils is dependent upon its carbonate content, the hardness of the stone, and the fineness of grinding. Of these, the percentage of total carbonates present is the most important.

Usually only the highest quality deposits are used for crushing, but the commercial supplies at present made available to farmers cover a very wide range of carbonate contents. This is mainly accounted for by the uneven nature of the deposits, but commercial samples which are consistently low in carbonate content should be supplied at a cheaper rate.

Classification

In general, ground limestones may be classified on the basis of carbonate contents as:—

Over 85 per cent. carbonate: high grade.

70-85 per cent. of carbonate: medium grade.

Below 70 per cent. carbonate: low grade.

There is no simple method of determining purity of ground limestone, but a good idea as to the amount of sand and other inert impurities present can be obtained by treating a small sample in a clean bottle with weak hydrochloric acid or "spirits of salts" which has not been "killed" and noting the amount of undissolved residue.

Generally speaking, a soft rock is more easily ground and is more readily soluble in the soil water than is a hard rock, but the effects of difference in hardness can be very largely overcome by the effects of fineness of grinding. This is very important, for the finer the rock is ground, the more evenly can it be distributed, and the more rapidly will it go into solution. On the other hand, a limestone that is too finely ground will not spread evenly from the topdresser or the drill, and it is more readily lost in the drainage water.

Consequently, ordinary ground limestone should contain a large percentage of fine material which will produce a quick action in the soil, together with sufficient of the coarser fractions which will help it to run through the topdresser and will remain in the soil and continue to give some benefit over a period of years.

Many farmers are fortunate in having outcrops of limestone on their properties suitable for working by portable crushers, while others can use local deposits of soft swamp marl, which may not even require crushing.

Burnt Lime

Burnt lime or quick-lime is prepared by burning limestone or shells at red heat, and the purity of the product depends mainly on the carbonate content of the limestone used. In the process of burning, 100 lb. of pure carbonate loses 44 lb. of gas and yields 56 lb. of burnt lime or calcium oxide. When 100 lb. of a limestone containing only 80 per cent. carbonate (and 20 per cent. impurities) is burned, it will yield only four-fifths as much oxide as the pure stone, or 45 lb.

The impurities are not usually greatly changed by burning, so that the commercial product obtained from 100 lb. of an 80 per cent. carbonate limestone will be made up of 45 lb. of oxide and 20 lb. of impurities, making 65 lb. of an impure quick-lime. Of course, the lower the purity of the original rock, the lower will be the quality of the burnt lime produced from it. Even more serious than this variation in the quality of the limestone used for burning is the fact that burnt lime gradually slakes or changes back to its original carbonate form if exposed to moist air, with a consequent fall in the percentage of oxide present.

Generally speaking, the quality of the burnt lime made available to farmers is so uneven and the price so variable that it should not be purchased before making the fullest inquiries as to its purity and its value from officers of the Department of Agriculture.

Both forms of lime have finally much the same effect on soils, but when first applied there is some difference between the effects of burnt lime and of ground limestone. Burnt lime is more soluble and therefore produces its effects on the soil much more quickly than the carbonate, which is only slowly soluble. For this reason it is often used as a preventative for "club root."

If the unpleasant nature of the burnt lime is not considered, then the choice of which form to apply is largely de-

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termined by the costs of cartage and the relative per ton costs of the two forms. One ton of good burnt lime is equal to 1½ to 1¾ tons of the ground limestone.

Quantity Needed

Although there are many useful laboratory methods of determining the lime requirement of a field, it is essential that the method used should have been checked against field results on a similar soil and that the rainfall, management, kind of crops to be grown, and fertilisers used be taken into consideration before making recommendations on the laboratory results. At best, all recommendations as to the quantity of lime to be applied to a field are approximations.

Local knowledge of a district, its definite soil types, its farming methods, and the responses obtained from fertilisers are invaluable guides to a liming programme, and whenever possible full use should be made of the information available through officers of the Department of Agriculture.

Initial Application

In order to build up the lime status of a sour clay soil to a satisfactory level an initial application of from 1 to 1½ tons per acre may be required, while the equivalent of about 1 ton every four to five years should be applied to maintain the lime status. On the lighter stony soils an initial dressing of from 10 cwt. to 1 ton should be adequate if followed by light annual applications of 2 to 3 cwt. per annum or 1 ton every eight to ten years.

It is of interest to note that in Southland much heavier dressings than these are frequently made and give excellent results. The common method of applying small dressings of from 1 to 3 cwt. along with superphosphate to pasture is a very satisfactory method of maintaining the lime status of the soil, especially if used after a heavy initial dressing.

An excess of lime in the soil is not desirable, but the quantities which would have to be applied to most lime-deficient soils before detrimental effects upon crops would result are so high that there is little danger of overliming. However, as some crops require a higher lime content in the soil than others, it is best to lime for the particular crop to be grown. If a rotation is practised, the application should be made before sowing the particular crop which requires the highest lime content in the soil.

It should be borne in mind that other factors in soil management and manuring are important aids in stimulating growth of clovers and other lime-loving crops on sour soils. Thus, the ploughing-in of green crops or the application of superphosphate, slag, or rock phosphate may so improve soil conditions as to make possible a fair growth of these crops on soils that are otherwise too sour to grow them well.

Fig. 5.—**A heavy initial dressing is desirable on most fields, and in many cases may make all the difference to the quality of the pasture.**

[*R. C. Beck, photo.*

Fig. 6.—**The value of lime is usually increased by the use of fertilisers, and fertilisers give the best results on limed land. Here is a lime and superphosphate response on sour foothill country in Canterbury. The unmanured line between each trip of the topdresser and the broad band to the left of the picture are clearly marked.**

[*R. C. Beck, photo.*

Application Of Lime

Burnt lime or very heavy dressings of the ground limestone should not be applied while any tender crop is growing. These dressings are best made during the final stages in the preparation of a seed bed for a cultivated crop so that the lime becomes thoroughly incorporated with the soil during the process of cultivation. It is not advisable to deep work the lime. If it is harrowed into the top of the seed bed it will be distributed through the lower layers quite rapidly enough in the drainage water. Small annual dressings may be applied to grass land whenever it is convenient, and, except where the lime is applied with fertilisers, the time of application is not important.

During recent years the great expansion in the application of lime during the autumn has resulted in many orders for delivery being delayed. By spreading their demands for lime throughout the year, farmers could reduce congestion at the works.

Effect on Pastures

A large percentage of New Zealand pastures need lime. The use of lime on acid or sour soils tends to encourage the development of perennial ryegrass and clovers. It is desirable to increase the growth of these plants, for they are highly palatable to stock and are high in nutritive value. On permanent pastures to which lime may be applied as a topdressing the soil does not need to be sweetened to a great depth. Accordingly, ½ to 1 ton per acre is usually sufficient for any one application.

If sufficient phosphate is supplied, pasture grasses and clover will grow well on soils that are quite acid. Some soils, moreover, are so strongly acid and so steep or rough that it is uneconomic to lime them under present conditions. Cocksfoot, danthonia, and the fescues make fairly good growth on soils of rather high acidity, and therefore liming on steep areas where these grasses predominate should not be generally adopted.

Lime Stimulates Clovers

Generally speaking, lime is of greatest direct benefit to the clovers in the pasture. Clovers are essential for low-cost feed production, and the nitrogen which they fix in their roots under favourable soil conditions is required by all non-legume crops (cereals, root crops, and grasses). Indeed, lime is often called an indirect nitrogenous fertiliser for this very reason.

Liming is therefore essential on sour soil for the production of the regular rotation crops, wheat, oats, clover, and ryegrass and turnips. As clover builds up the fertility of the soil, it is the most important of these crops, and lime helps to grow clover. If the clover crop is good, then the crops following it will yield well.

The results of experiments conducted at many centres in New Zealand have shown that liming tends to stimulate the pastures most strongly during summer and autumn, periods that are normally of low production. They have also shown that pastures grown on limed land are richer in both lime and phosphate than are similar pastures grown on unlimed land.

Spread of Effects

The effects of a heavy application of lime may be spread over many years, the length of time depending upon the rainfall and various properties of the soil. For example, an area at Lincoln College which received a dressing of 2 tons per acre is still outstanding after 14 years. Of course, it is impossible to distinguish between the results directly due to the liming and those due to the increased fertility of the soil built up through the stimulation of the clovers in the pasture, but it is important to remember that the interest on an investment in adequate liming is paid year in and year out for a long time, be they years of good growth or drought years. (That limed pastures will resist drought better than unlimed pastures is a point now well known to Canterbury farmers.)

Indeed, the indirect effects of liming upon soil fertility and upon the palatability of pastures are probably of

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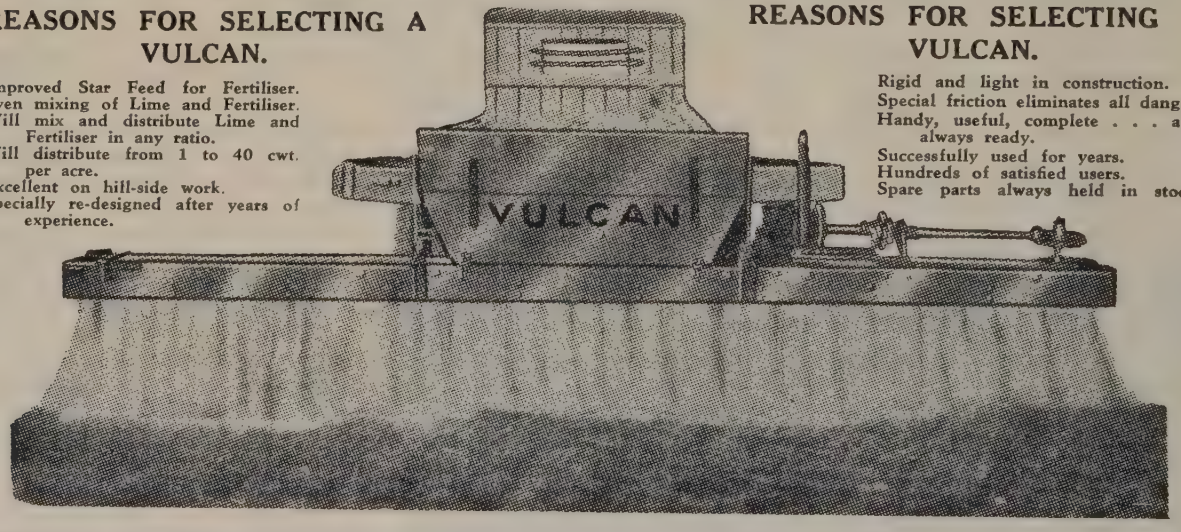

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even greater value than is the increased production from the pastures.

Use of Lime With Super

Any form of lime in a ready mixed fertiliser reacts with the soluble phosphoric acid, causing it to revert or change from a readily soluble form to a less soluble form, thereby reducing the availability of the superphosphate used in the mixture. Advantage is taken of this reaction to produce reverted super, the special fertiliser prepared for drilling with seeds which are susceptible to burning when sown in contact with ordinary super. Accordingly, a mixture of lime and super, or reverted super, is usually used when sowing swedes, turnips, and other cruciferous crops. This reversion does not take place to any extent when the lime and super are mixed just before they are applied. (If a mixture of lime and super is to be set aside for some time before use the mixture should be shovelled over a few times at intervals of several hours before it is bagged in order to prevent setting.)

If maximum returns and efficiency from super are desired it is essential that lime be applied to sour soils either before the phosphate is applied or with the phosphate. If phosphate is added directly to sour soils a large amount of the soluable phosphate is fixed in a form unavailable to corps by iron, aluminium, and other substances which are not active in well-limed soils. Experience has shown that the value of lime is usually increased by the use of fertilisers, and also that fertilisers give the best results when lime is adequate.

Summary

Nearly all natural waters contain lime dissolved out of the rocks and soil. In this way the soil gradually loses its lime and becomes sour or acid; the lime is transported to the ocean, where it is deposited in beds by the accumulation of dead shellfish and the small marine organisms with shells of lime. Most of the limestone deposits now used in agriculture have accumulated in this way and then have been thrust up from the ocean floor.

Loss of lime, deterioration of pastures, and depletion of fertility go hand in hand, and their effects can be offset only by making good these losses of lime. Indeed, adequate liming is a basic step in building up and maintaining the fertility of considerable areas of farming land.

The quantity of lime applied to a soil depends upon the properties of the soil, its management, and the crop to be grown. Soils which are deficient in lime should be given a heavy initial dressing of at least 1 to 1½ tons for heavy soils and ½ to 1 ton for light soils. This should be followed by light annual maintenance dressings or heavy applications spaced at longer intervals.

The most generally suitable form is the ground limestone rock. On cultivated land lime is most effectively applied during the final stages in the preparation of a seed bed for a lime-loving crop. On established pasture lime may be applied at any convenient period of the year. Farmers could help to ensure themselves of prompt deliveries from the works by ordering supplies throughout the year.

Lime tends to encourage clovers which build up the soil fertility; for this reason lime is often called an indirect nitrogenous fertiliser. Pastures grown on well-limed land are richer in both lime and phosphate.

To obtain the greatest value from fertilisers, the lime content of the soil should be adequate, and conversely the greatest benefit from lime is received when the soil is well fertilised.

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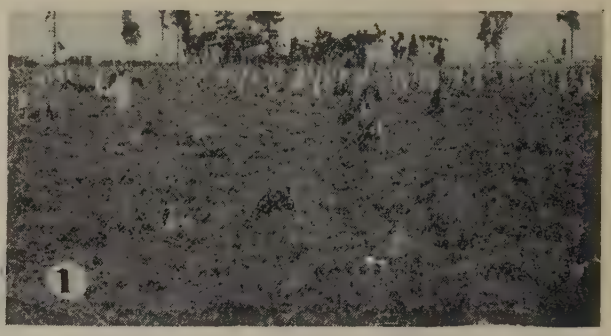
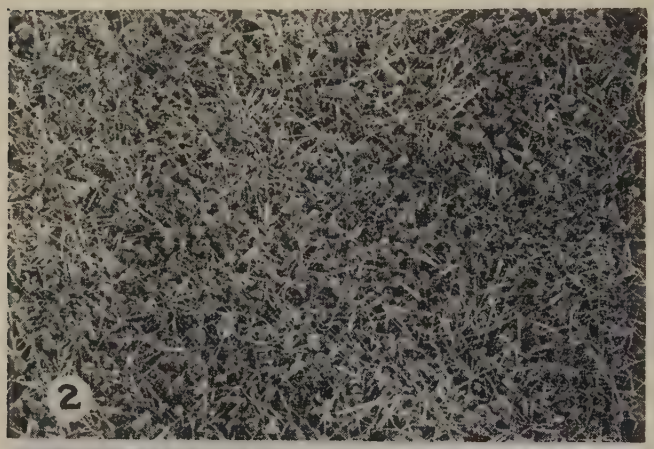
Problem of Winter Poaching of Land In the Hauraki Plains

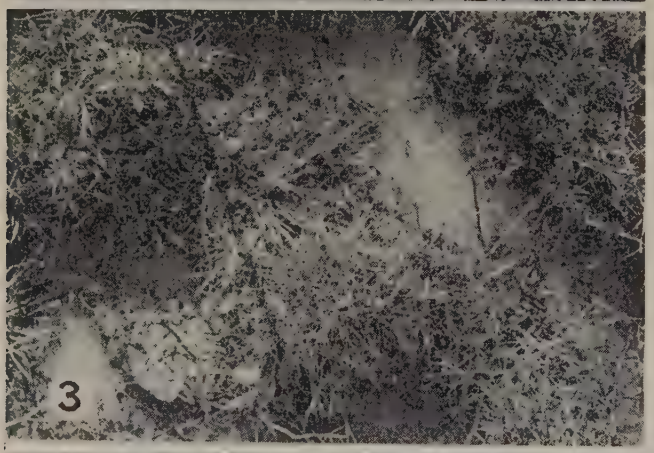
By C. WALKER,
Instructor in Agriculture, Thames.

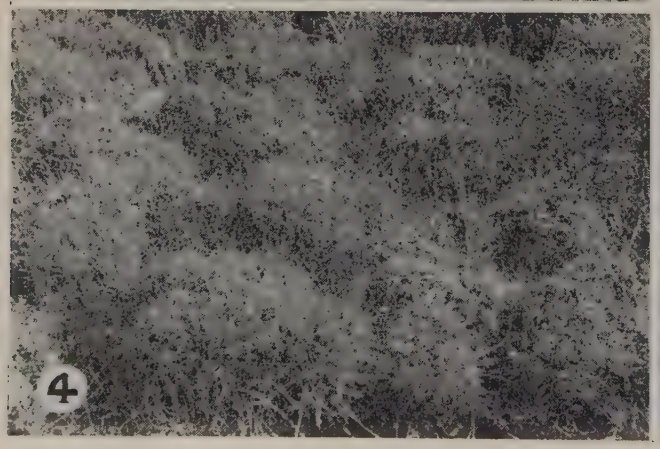


FOR some time much concern has been caused to farmers through the regular and serious poaching of grassland areas that were once covered by the waters of the Hauraki Gulf. Various theories as to the cause of this trouble have been advanced from time to time. These range from a contention that serious worm infestation is the cause to other views that winter saturation or chemical effects are producing the detrimental results.

The purpose of this article is not to examine these theories. Not enough is at present known of causes to make a definite pronouncement, and much research work will probably be necessary before any light is thrown on the problem. However, out of the little investigation that has proceeded some interesting points having an important practical bearing on the handling of this







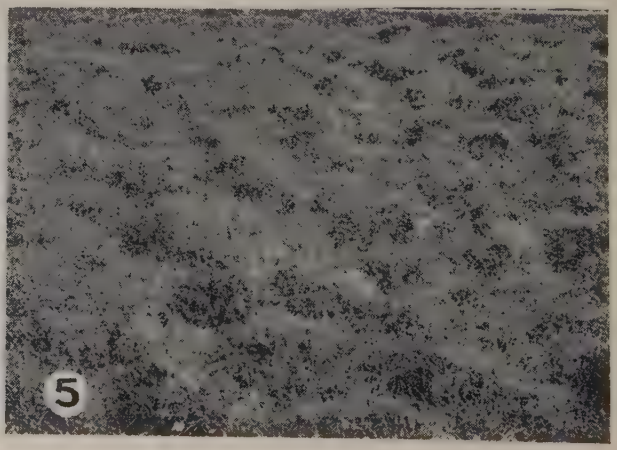


Fig. 1.—Early pasture establishment on Kahikatea and cabbage tree country.

Fig. 2.—Type of pasture before poaching. Ryegrass, white clover and strawberry clover dominant.

Fig. 3.—Badly poached country. Note water and inferior vegetation, chiefly creeping bent and *glyceria.*

Fig. 4.—Further indication of poaching effect.

Fig. 5.—General view of poached field.

Fig. 6.—A 3-ton concrete roller at work.

Fig. 7.—Tractor fitted with wheel extensions.

Fig. 8.—Front view of tractor, showing extensions on all wheels.

country have been noted, and I propose to deal with these fairly briefly. The main points to which I refer are winter rolling, surface draining, and soil grading.

Winter Rolling

In the past, it was customary to allow badly poached fields, such as those in the illustrations, to dry out sufficiently to enable discs, clod crushers, and harrows to be used in an endeavour to level surfaces. Some seed may also have been sown. In a favourable spring a reasonable measure of success resulted, but, when dry conditions set in, there was little or no recovery. Moreover, the period during which such work could proceed was strictly limited, so that only a few fields on each farm could receive attention. Obviously, this method was of little value as a complete remedy, and a realisation of this fact caused thought to be given to other measures.

One of these, as yet in its infancy, was that of winter rolling the pastures. This work was carried out with the aid of tractors having special extensions to wheels, as horses are quite unable to operate on this country during winter. No special time or soil condition has yet been selected as preferable to others, but the general opinion is that so long as there is sufficient pasture to hold the surface together, no harm will come from rolling. In fact, some farmers prefer to see ample surface water travelling before the roller. When the surface is too soft for a roller, the tractor alone, if fitted with wheel extensions, does quite a good levelling job.

A variety of rollers are in use. Some employ the ordinary Cambridge roller, some have light concrete rollers, while others range to the extremes of five-ton rollers on a 7 ft. axle. The ideal appears to be one of reinforced concrete, of large diameter to reduce the tendency to push soil, but hollow so that the weight can be varied by adding or removing water ballast. Such

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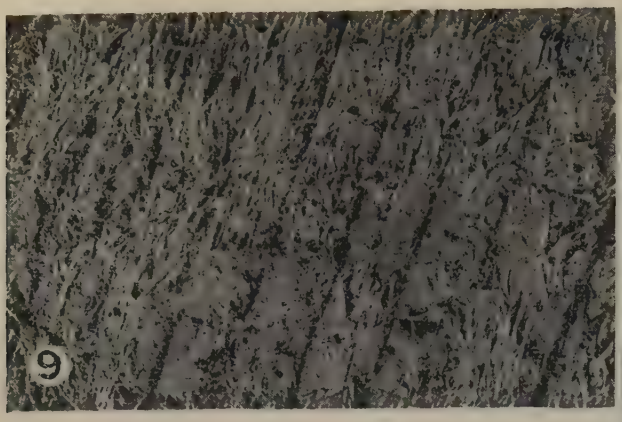

Fig. 9.—Poached country rolled on 10/9/40 and photographed on 13/9/40.

Fig. 10.—Same area as in Fig. 9 photographed on 23/9/40. Note marked recovery within 10 days.

Fig. 11.—Rolled country with shallow surface drains. Pasture dominantly ryegrass, white clover and strawberry clover.

Fig. 12.—A field graded into narrow lands. Note bare furrows; white crests are a mass of buttercup.

Fig. 14.—Older graded country. Furrows poach badly, grow inferior grasses, rushes, pennyroyal, etc.

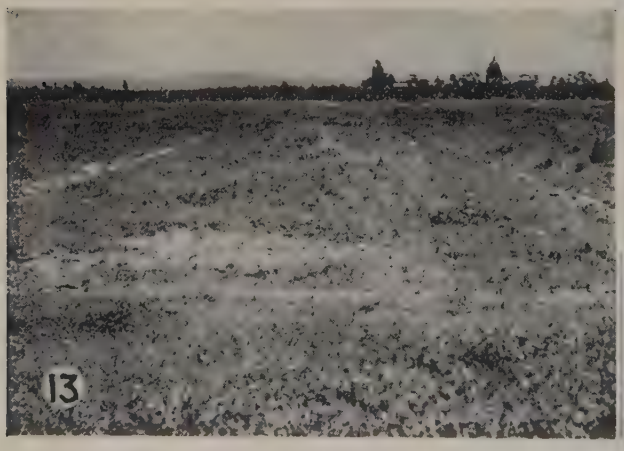

Fig. 13.—Another view of graded area showing features of Fig. 12.

a roller could be used on very wet soils or, when weighted, on drying areas. Thus, it would be possible to begin rolling quite early and continue fairly well into the spring.

From results so far examined rolling appears to be having marked beneficial effects in the pastures. Where, a few years ago, creeping bent, *glyceria*, pennyroyal, and similar plants were dominant, today, after two or three rollings, the pastures are rapidly developing into good ryegrass—white clover and strawberry clover swards. Moreover, rolling leaves the surface in excellent condition for the handling of farm implements.

Naturally, there are some who disagree with the principle of rolling. Soil packing is the chief objection raised, but rolling can never equal the effect of ordinary stock tramping in this respect.

Where rolling has been left rather later, a cut with the discs will be helpful in preparing the land for subsequent rolling, but from observations backed by farmers' opinions it is sounder to roll before this procedure is necessary.

Surface Drainage

On all soils adequate drainage is a material factor in promoting farm production. On the Hauraki Plains sufficient large drains must be kept in good condition. In addition, a series of shallow surface drains have been found very helpful in removing rainfall and surface water generally. On some farms these have been put in at regular intervals of ½ chain to 1 chain, while on others no set system appears to be employed. The country where these shallow drains are used is certainly in better pasture than that without drains, but there is just a tendency for the surface to become uneven after winter tramping.

Consequently, I am inclined to think that the ideal practice would be to use shallow drains and also to roll the country. Where this is done, there has certainly been the greatest progress. Both practices are excellent, but should be regarded as complementary rather than as alternative.

Surface drains may be put in with a shovel, but most are now constructed with a grader, after which the soil is graded back over the lands to fill depressions and so leave the surface as even and as level as possible.

These shallow drains are a slight handicap in the working of implements,

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but they do not provide a serious difficulty where the surface is kept level.

Soil Grading

A further measure employed in handling this problem is to grade the country into narrow, fairly steep-sided lands. These range in width from furrow to furrow from six yards to ½ chain. Generally, the crest of the land is about 18 in. above the bottom of the furrow. It is claimed that by this system of preparing the land poaching is reduced, grass comes away earlier, and stock can be winter-grazed.

Examination of a number of areas, however, has led me to doubt whether the system has any advantages over other methods of handling. In the first place, the preparation of lands entails a great deal of grading, which would be costly on a hired labour or contract basis. Secondly, the use of implements is greatly restricted; and thirdly, depressions poach badly, become invaded with poor grasses, and grow weeds of the rush and penny-royal type.

Of the three methods discussed, I feel that a combination of rolling and surface draining provides the quickest, most economical, and most promising means of converting country from the badly poached condition to that where it will grow and hold good pasture.

Of grading into lands I have serious doubts, and would not recommend an extension of the practice at this stage. When one sees such rapid recovery from rolling as that depicted in the accompanying photographs, I think it must be conceded that the case for rolling alone, or for rolling and surface draining, is, at the least, a very strong one.

So confident are some of those practising it that they are certain of being able to winter stock without change in the near future. On these areas such a practice has not been possible for many years, but the progress of their land under the treatments described certainly indicates that their confidence is backed by sound, practical results.

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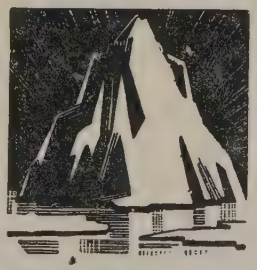
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Slaughterings of Stock

THE following returns of slaughterings of stock at meat-export slaughterhouses and abattoirs for the six months, May-October, 1940, have been compiled by the Stock Division:—

District	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Swine
North Island						
Meat Export Slaughterhouses—						
Auckland	93,392	531,732	68,494	40,210	103,581	92,931
Poverty Bay - Hawkes Bay	41,706	53,708	115,680	50,451	127,648	9,489
Taranaki-Manawatu ..	53,666	200,463	65,637	40,699	138,490	51,313
Wairarapa-Wellington ..	26,158	27,448	55,058	28,855	90,026	10,910
Totals	214,922	813,351	304,869	160,215	459,745	164,643
Abattoirs	64,998	21,701	240,598	122,321	17,569	50,509
North Island Totals ..	279,920	835,052	545,467	282,536	477,314	215,152
South Island						
Meat Export Slaughterhouses—						
Nelson-Marlborough ..	1,240	9,263	26,554	12,276	51,359	3,239
Canterbury	6,369	34,997	225,663	183,075	322,130	12,417
Otago-Southland ..	6,305	36,346	157,738	132,186	587,794	3,204
Totals	13,914	80,606	409,955	327,537	961,283	18,860
Abattoirs	28,056	6,809	131,601	64,245	9,850	18,922
South Island Totals ..	41,970	87,415	541,556	391,782	971,133	37,782
Dominion						
Meat-expt. Slauhterhouses	228,836	893,957	714,824	487,752	1,421,028	183,503
Abattoirs	93,054	28,510	372,199	186,566	27,419	69,431
Grand Totals	321,890	922,467	1,087,023	674,318	1,448,447	252,934
In addition the following stock were slaughtered at rural slaughterhouses during the six months ended 30/9/40 for local consumption	38,010	986	115,275	Unknown	4,026	13,343
Same Period, 1939—						
Meat Export Slaughterhouses and Abattoirs ..	264,605	909,971	827,526	434,603	1,504,878	185,314
Rural Slaughterhouses ..	39,522	1,136	115,862	—	4,363	13,628
Same Period, 1938—						
Meat Export Slaughterhouses and Abattoirs ..	248,500	878,953	938,762	543,511	1,339,795	255,844
Rural Slaughterhouses ..	44,240	1,292	107,144	—	3,807	14,079

Slaughterings of Pigs

The 54,993 pigs killed during October were distributed in weight ranges as follows:—

Under 60 lb.	718
60-110 lb.	8,535
111-120 lb.	5,864
121-160 lb.	24,734
161-180 lb.	10,605
Over 180 lb.	2,860
Sundry	1,677

The grading of pork is 81 per cent. primes and 19 per cent. second quality; and of bacon, 74 per cent., 20 per cent. and 6 per cent. of of prime 1's, prime 2's and second quality respectively.

In different weight ranges of baconers the grading is as follows:—

111-120 lb.	85%, 10%, 5% of P1, Pz and seconds.
121-160 lb.	77%, 18%, 5% of P1, P2 and seconds.
161-180 lb.	64%, 27%, 9% of P1, P2 and seconds.

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WHY WASTE ALL THAT MILK?

The adoption of certain practices in pig farming will reduce the present waste of milk by diverting it into pig feed. Much valuable information based on the numbers and weights of pigs killed and on the amounts of cheese and butter made makes it possible to show in figures the generally accepted belief that dairy by-products are not fully used.

IN 1933-34 there were approximately 720,000 pigs killed in New Zealand; in 1938-39 just over one million. In 1933-34 there were 634 million gallons of dairy by-products, equivalent to skim-milk, available for pigs; in 1938-39 there were 646 million gallons. One look at these figures makes it evident that there was either a considerable waste of milk or else a big increase in home-produced crops during this period. Both are true, with the accent on the waste of milk.

Setting out to increase pig production while this waste goes on is like trying to fill a bucket with a hole in the bottom. While some of the waste was unavoidable, much of it arose through failure to appreciate the peculiarities of a pig-feed supply comprising seasonally produced dairy by-products, and the consequent adoption of a policy that made the full use of milk difficult.

The change-over to bacon alters the whole situation. Will the production of bacon increase this waste? Will the increased amount of feed being grown for pigs produce a correspondingly increased amount of bacon, or will it be partly wasted as was milk through failure to have pigs in appropriate numbers and sizes to use it at the right time? The change from pork to bacon and the increased production make readjustments necessary, and these provide an excellent opportunity for improvement. A perusal of the following points may be of some assistance in making better use of available feed.

Former Pig-feed Position

The feed position for the years 1933-34 and 1938-39 is represented by the accompanying graphs. The amounts of milk available and the amounts of feed required for pigs are shown on the graphs (in millions of pounds each month) by the lengths of the vertical lines. The amounts of dairy by-products were calculated from the actual amount of cheese and butter made after making allowance for whey and milk used by calves. Feed required for pigs each month was calculated from the numbers and weights of pigs killed each month and the corresponding numbers and weights of pigs these represent in previous months. In working back to the month of birth, a varying rate of mortality and of growth rate was allowed, depending on the size of the pig and the season of the year.

In the graph the cross-line marked M in the right-hand margin cuts off on the verticals the actual number of gallons of skim-milk available for pigs each month. The line PB cuts off on the vertical the total amount of feed of all sorts required each month for pigs. This total is divided up into that required for maintenance of breeding stock, for suckers, weaners, stores, and for porkers and baconers. The lengths of the verticals from the bottom to where they are cut by the cross-line BS indicate the amount of feed required each month for the maintenance of breeding stock. The lengths of the verticals between the cross-line BS and the cross-line SS represent the feed used for producing suckers, weaners, and all pigs to a carcass weight of 60 lb. The lengths of the verticals between the cross-lines SS and PB represent the feed used for fattening pigs heavier than 60 lb. carcass.

In those months where M is above PB milk is being wasted, and where PB is above M, feed other than milk is being used. On the left-hand top corner the letters PB stand for pork and bacon, and S.W.S. for suckers,

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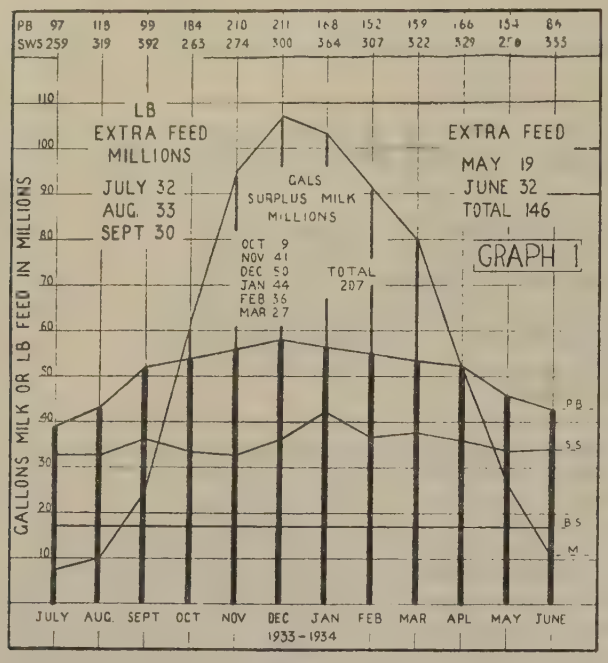

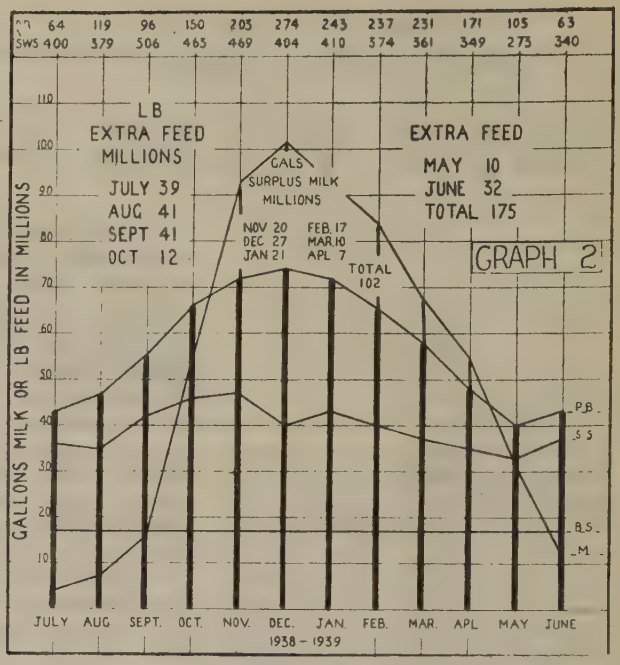

weaners, and stores. The figures across the top of the graph opposite these letters represent the number in thousands of pigs of these classes on hand at the middle of each month.

The estimated surplus of milk is conservative for the reasons that some grain or meal is used for fattening pigs in October, November, December, January, etc., and that considerable use is made of grass for breeding stock and store pigs during this period. No allowance could be made for these factors, and the waste of milk will be greater than indicated by the amount of meal and grazing used.

Graph 1: 1933-34.

Graph 1 shows a waste of 207 million gallons of dairy by-products. This represents a waste of approximately one gallon in every three. It extends from October to March, but occurs chiefly in November, December, January, and February. There are 146 million pounds of feed "other than milk" used throughout the year. The least amount of pig feed is used in July, and the greatest in December, but the increase from July to December is relatively small.

There is a fairly constant amount of the total feed used by young and growing pigs (see also the numbers of these each month at the top of graph, second line). There should be more of these pigs in mid-winter and fewer in November, December, and again in April-May. There are too many porkers and baconers through June, July, and August (see top line of figures).

Graph 2: 1938-39.

The waste of skim-milk has been reduced to 102 million gallons—approximately only one gallon in seven. The waste takes place from November onwards to April, but reaches its peak, as before, in the summer months. There are 175 million pounds of feed other than milk used, which represents an increase of just on 20 per cent. above that used in 1933-34. There is a big increase in the number of growing pigs in July, accompanied by a decrease in the heavy pigs. This larger number of young pigs in July means an increased consuming capacity in mid-summer. The increase in feed used from winter to summer is nearly double the increase in 1933-34.

How Does the Waste Occur?

Part of the waste of dairy by-products is accounted for by the whey that goes down the drain, and part by excessive amounts fed to pigs that are being forced or to smaller pigs that have been unduly starved and fail to respond to liberal feeding. The two latter portions get down the pig's throat all right, and to all appearances are not wasted; nevertheless, the waste is just as real as if the milk were poured down the drain.

Why Does the Waste Occur?

Probably the national approach to the use of skim-milk was not the correct one. At any rate the gradual improvement that is taking place is evidence that all is not well with the industry. No other country had had any experience of producing pigs mainly on milk, and in the absence of any

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example, New Zealand producers followed the usual practice adopted in other countries that produced pigs on grain.

What Are the Standard Practices?

Lifelong experience of pig-keeping had made commonplace the fact that pigs, as distinct from other classes of livestock, have two peaks of production each year, and had established well-defined ways of meeting this peculiarity. The most obvious way is to set aside reserves of feed and use them in increasing amounts as the litter grows, and where grain is the main source of supply storage is easily done. As these feed reserves can be set aside for any months of the year, sow farrowings in countries where grain is fed are distributed evenly throughout the year. The bulk of the production is bacon, as in Canada, Denmark, and other continental countries.

Alternative to, but often associated with, the storage of reserve feed, a second practice is to maintain a constant mixed population of pigs, suckers, stores, porkers, and baconers which use the same amount of feed in every month of the year. Under these conditions considerable use is made of the store market, and both pork and bacon are produced. This practice again favours farrowings evenly distributed throughout the year.

Through failing to realise that one peak of feed supply was automatically provided by skim-milk the New Zealand farmer adopted the practices of having farrowings fairly evenly distributed throughout the year, of making considerable use of the store market, and of producing both pork and bacon. These Old World practices were inadequate to meet the situation, and for this reason the following adjustment peculiar to New Zealand became general:—

(1) Taking only one litter a year off sows; only 55 to 60 sows in every hundred have two litters a year.

(2) Killing the bulk of the pigs in late summer and autumn.

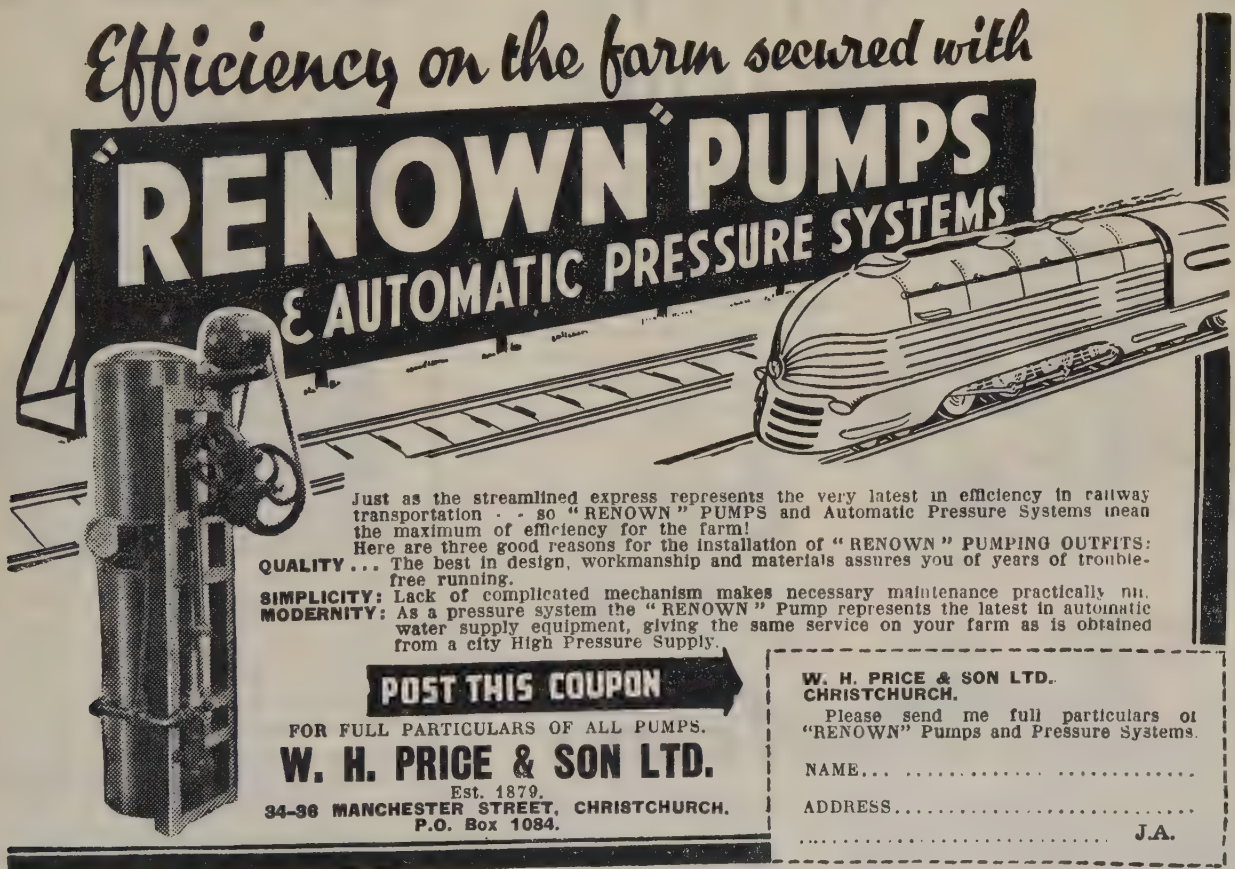
(3) Killing light and unfinished pigs at the end of the season.

In spite of these easements, milk is still wasted.

How Improvement Could Be Made

(a) Get Sows to Farrow All at One Time.—The greatest advance that can be made in the pig industry would be to have all farrowings concentrated into a few months of the year. With this arrangement there would be mainly weaners and stores on hand in some months of the year, and mainly porkers and baconers in other months. This specialisation would make available sufficient weaners and stores to use the milk supply in mid-summer and bring them to baconer weights. In the absence of older pigs the younger ones could be well fed, and this would make it possible to get baconers away in six to seven months. The average baconer now takes 7½ to eight months to fatten, because as a store he is neglected, while the older pigs are getting the best attention and feed.

With dairy cows, 80 per cent. of the calvings take place in July, August, and September. It should be easier to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get all sows farrowing within three months, because the annual replacement of sows is about one in four, and maiden sows brought-in in the first month of the three months period would still be farrowing their last litters in the third month of the period even though they farrowed three weeks later each year.

As a maximum of feed is available in November, December, and January, it follows that pigs should be farrowed so as to have baconers in these months. This, as a rule, means getting all sows to farrow during May, June, and July, and again during November, December, and January. These second litters require a smaller maximum of feed in April and May, and should be killed as pork and light bacon. With this arrangement, no winter stores are carried, and feed now used for stores is used for litter production.

(b) Get Two Litters a Year.—In the past, only 55 to 60 sows out of every 100 had two litters a year. As a result, 100,000 sows were kept to produce one million pigs for slaughter each year. The same number of pigs could be produced from 70,000 sows if every sow had two litters a year. This reduction in sows would make available for production almost enough feed to produce half the extra bacon required for export. While sow farrowings are evenly distributed throughout the year it is necessary to carry some stores through the winter, and these use the feed that should be given to the winter-born litters.

The first steps towards getting more second litters is to get all farrowings taking place over a short period and removing the winter store pig. With a reduced number of sows, with farrowings concentrated into three months of the year, and with all sows having two litters a year, an entirely new picture of the monthly pig feed requirements is obtained, and is set out on Graph 3.

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Graph 3.

There is a waste of milk here, but only in November, February, and March—a total of 20 million gallons. Extra feed has to be provided to the extent of 221 million pounds. In late winter less is required than is now used, and the chief increase is in January, April, and May. There is a big increase in the number of pigs and a decrease in the size of pigs carried through the winter. There are no big winter stores, and all pigs are lighter than 60 lb. carcass even in September. The greater number of wintered pigs growing to bacon weight at midsummer are sufficient to use all the milk. Killings are confined to December, January, and February as heavy bacon from the May, June, and July farrowings, and to May and June as light bacon and pork from the midsummer farrowings.

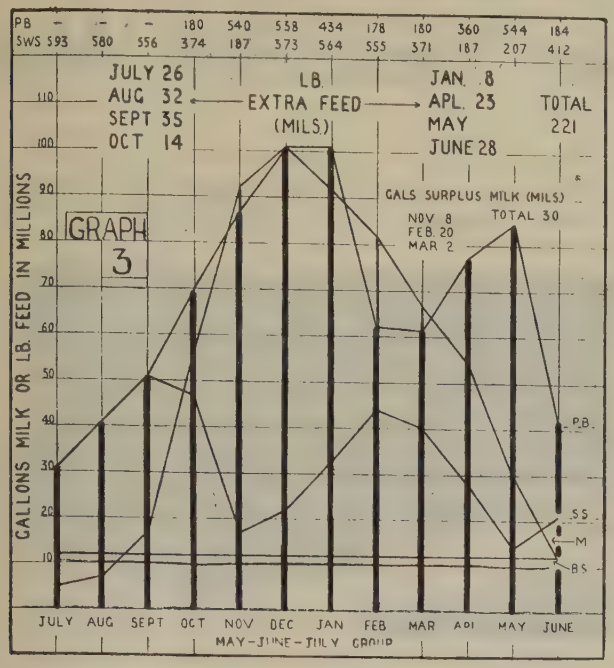
Under these conditions the total kill would exceed 133 million lb. of meat, an increase of just on 30 per cent. over the present killings. Obtained from 75,000 sows, this represents the reward for eliminating the waste of milk, for growing some extra crops, for getting two litters a year, and for getting all sows to farrow during a three-month period. As an offset against the convenience of our present method, this increase is worth considering.

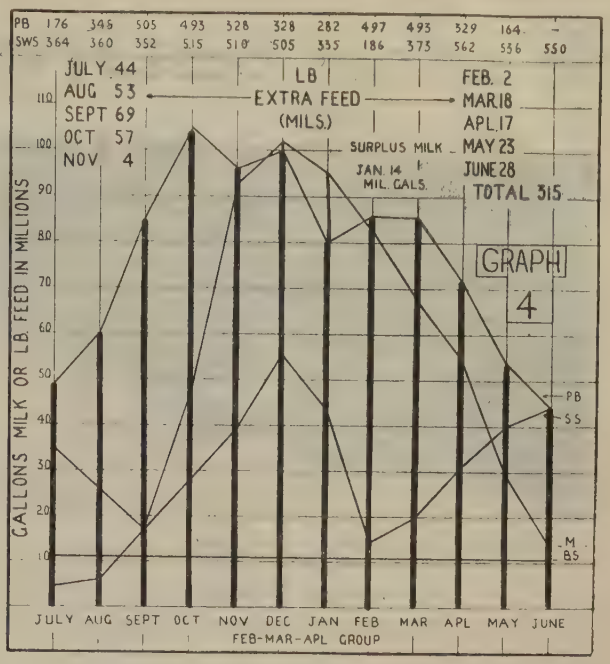
Those who are interested will be anxious to compare the case just discussed with what happens when sows farrow throughout February, March, and April, and for purposes of comparison a graph showing the results of February, March, and April farrowings is included.

Graph 4.

By concentrating farrowings into these three months and six months later it is possible to have a sufficient number of pigs from about 70,000 sows to use all the summer milk. The peak of feed now required no longer coincides with the peak of milk production, and feed required other than milk is increased to 315 million lb. The chief increase in the extra feed used occurs in August, September, October, February, March, and April. All second litters are killed by the end of May, as before, but by July the February-born pigs are past the store stage, and as a result there are many big stores in early spring.

Not only is the peak of feed requirement out of step with the peak of milk





production, but pigs have to be fed on an average for a month longer than when farrowings take place in May, June, and July, and too big a proportion of the year's feed supply is used to fatten pigs in cold weather. Where no calves are reared, or where roots are grown in quantity, or where cows come in early and quickly reach maximum production, farrowing in these months may appear to be justified, but it can scarcely be defended from a reasoned viewpoint.

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Summary

The suggested policy could be summed up as follows:—

(1) A waste that is partly avoidable occurs in the use of skim-milk.

(2) Farmers should give more consideration to fitting their pig numbers to the period of maximum milk supply, rather than to the period of minimum milk.

(3) While this is a problem each individual has to solve in his own way, it can best be solved nationally by having sows farrow in May, June, or July, preferably in June, and again six months later.

(4) By taking two litters a year off all sows and thus either increasing production or cutting down overhead expense.

(5) Farrowing as above means carrying a greater number of smaller pigs through the winter on the same feed as is now required by a smaller number of bigger stores, and consequently means having a greater number of porkers and baconers to consume the flush of milk in November and December.

(6) Kill May, June, July born pigs as baconers in December, January, and February, and at heavier weight than is now usual; take the second litters' pigs to pork and light bacon by the end of May.

(7) Get pigs to bacon weights in seven months and to pork weights in five, and so avoid overlapping of litters; carry no big stores in winter.

(8) Speed up the tendency to use a bigger proportion of home-grown crops in April and October. Pigs make the best use of feed in warm weather. The farrowing times suggested above make it possible to use more feed in the warmer weather.

From the 1938-39 graph it is evident that there is even now a strong and growing tendency to reduce the number of heavy pigs carried in May, June, and July, and to increase the number of younger pigs in these months. A speeding up of this tendency is desirable.

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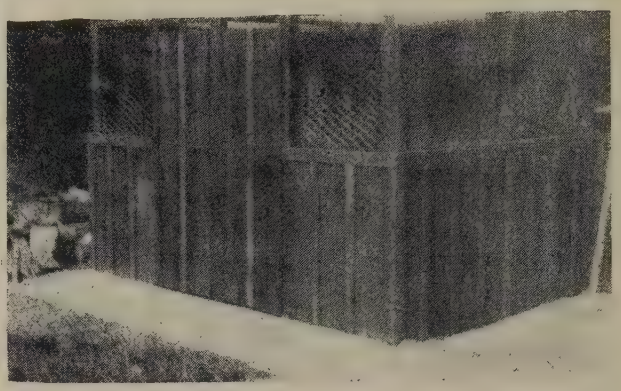
Two views of an ideal kennel on the property of Mr. L. Baker, Rissington. Note the airy, hygienic surroundings.



By A. D. M. G. LAING,
Veterinarian, Hastings.

SHEEP farming in New Zealand without the sheep dog would be difficult, if not impossible. The shepherd's dog is, in fact, a valuable and indispensable asset to the country, and it is a truism to state that in the great majority of cases he is appreciated at his true worth. That is not to say, however, that there are not instances where improvements in feeding and housing would result in better health and more efficient working on the part of the dogs.

It is impossible in these short notes to discuss all aspects of the question fully, and it is proposed to mention only three main points—housing, feeding, and health.

Housing

The ideal in housing is a dry and well-ventilated kennel, free from draughts, which can be easily cleaned out at intervals. The addition of a small yard will eliminate the necessity of keeping the dog on a length of chain for long periods, a proceeding which is not beneficial to the dog's health.

Short of the above, much can be done to ensure the dog being reasonably warm, dry, and comfortable. Kennels can, for instance, be made easily movable, and sites should be changed at frequent intervals. Surroundings should be sheltered, sunny in winter, and clean, and drinking water should always be available.

Feeding

The working dog must be adequately fed once daily in the evening when the day's work is over. The common practice is to kill for "dog-tucker" at suitable intervals. Under the Meat Regulations, 1940, it is an offence to give dogs raw livers or cause them to be fed with any diseased meat or offal in view of the grave menace to human health from hydatids.

The meat is apt to become somewhat high during summer unless a large

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number of dogs are kept on the place. Furthermore, it has been proved that an exclusive diet of flesh for the working dog does not give as good results as a mixed diet containing a proportion of starchy foods.

Some bones must be provided, as they are essential to the proper functioning of the dog's digestive processes. Rabbit and poultry bones are, however, not suitable, as they are hard, dense, and splintery, and can cause laceration of the gut, or may accumulate in the gut into dense compact obstructions.

It is suggested that a more suitable and simple method of feeding is by the use of meat-meal such as is fed to pigs, combined with a proportion of household scraps and bones, the last being essential for the dog's good health.

In one instance which came under the writer's notice (Mr. William Taylor, Havelock North), working dogs have been kept in excellent order for a number of years on 10 to 12 oz. of meat-meal daily, made into a thin soup, with skim-milk and with a proportion of household scraps and bones added. The meat-meal costs 12s per cwt. On other places, a proportion of pollard mixed with meat-meal has given good results. It is stated that dogs so fed have far less tendency to wander when let off the chain or to interfere with dead carcasses.

It should be remembered that "the labourer is worthy of his hire," and the great services rendered to his owner by the sheep dog are worthy of comfortable kenneling and good feeding. In particular, the practice of allowing sheep dogs off the chain daily to feed on the nearest dead carcass is not wise. The dog is not naturally a feeder on carrion, in which he differs from the jackal and the hyena, and sheep dogs which are allowed to feed on dead carcasses run a grave risk of sooner or later becoming sheep-worriers.

Health.

The farm dog which is allowed to feed on hydatid-infested offal or carcasses is a grave menace to human health. Meat-meal, whether used continuously, as above, or as a supplement to specially-killed carcasses, will prevent this in conjunction with the arecoline dose issued with the dog licence and administered quarterly. This dosing also eliminates the large tapeworm of the dog if it is present, which definitely affects canine health. Economically increased returns will result from no carcasses or offals being condemned at the works for hydatid infestation.

In view of the serious dislocation of farming operations which results from the ravages of distemper, it is surprising that more use is not made of the very efficient preventative properties of the distemper vaccine. The work is carried out by veterinary surgeons in private practice at a very moderate charge per head, and arrangements are usually made through local Dog Trial Associations for collecting points in lots of 50 to 100. The vaccine is now obtainable from Australia and only one month's notice is necessary instead of three months as was previously the case when it was obtained from Britain.

It cannot be too strongly emphasised that vaccination by the serum-virus (vaccine-virus) method is the only method known to veterinary science of preventing distemper, and that it is extremely efficient.

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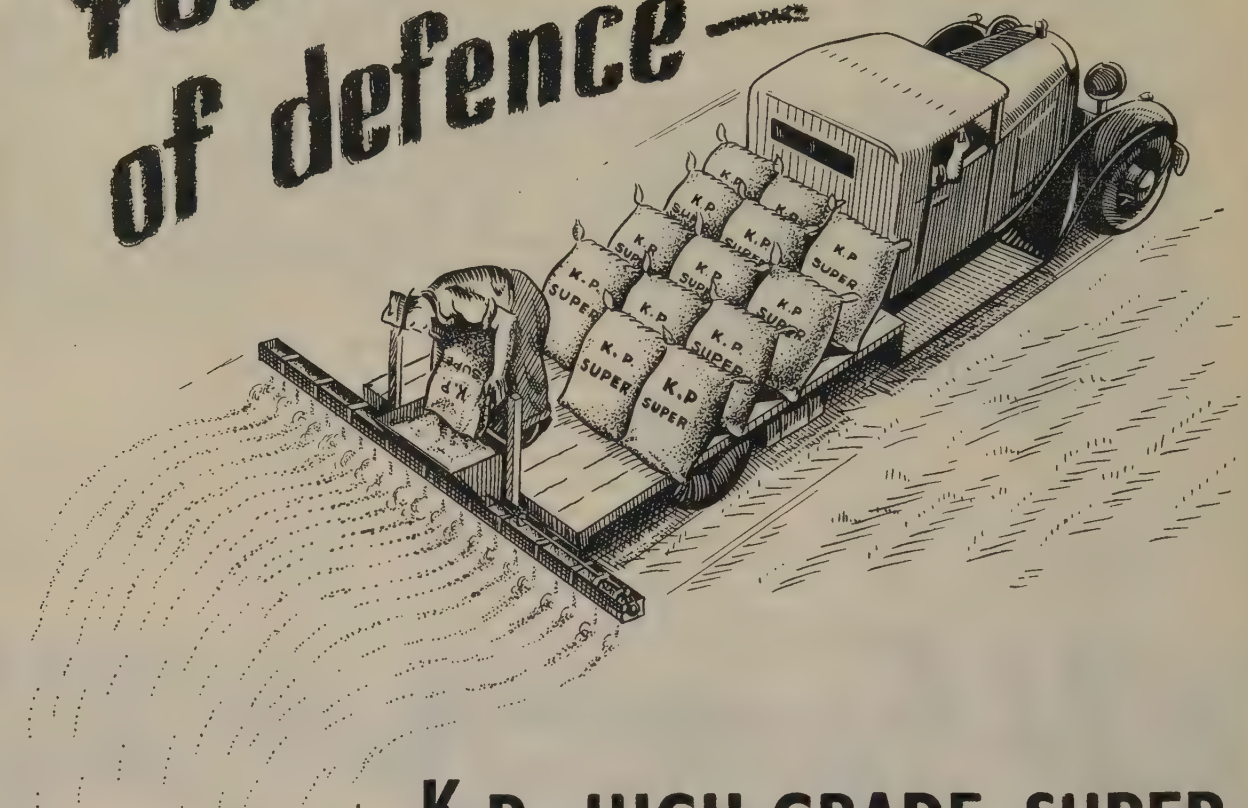

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Reducing the Hazards of Grassland Farming

Unusual Silo On A Northland Farm

By P. S. SYME,
Instructor in Agriculture, Warkworth.

Above. — The completed silo. Carting out feed for the stock.
Left. — Feeding out silage. This proved to be of excellent quality, and was greedily eaten by the stock.

THE relative importance of the part played by feeding as compared with breeding in the production of a high herd average has long been a common subject of debate between dairy farmers, and the view has even been expressed that "Half the breeding lies in the feeding." Whether or not this be altogether accurate, it will be freely admitted that on practically every farm where the cows are well fed throughout the year the yield of the herd will at least be creditable.

When it is considered that two-thirds of the normal pasture growth is provided in about four months of the year and only one-third in the remaining eight months, the necessity of conserving a generous portion of this lavish surplus for use during the lean winter months will be fully appreciated.

Complementary Systems

Normally, the bulk of this surplus is saved as hay, but many progressive farmers regularly make silage as well as hay. The two systems may properly be regarded as being complementary rather than competitive, and the most efficient utilisation of the surplus grass and of the farm labour is usually to be expected from a combination of both these methods of conservation. The comparative effects of cutting for ensilage and cutting for hay on the pasture sward must also be taken into account.

Under New Zealand conditions the stack and the pit systems have generally proved most suitable, and the tower silo—so popular in certain other countries—has not proved entirely satisfactory here. The main objection to the use of the tower silo, apart from its fixed position and its initial cost, has undoubtedly been the difficulty experienced in filling such a tall silo without the use of expensive plant. This difficulty has been overcome on the farm of Messrs. H. S. Langridge and Sons, Warkworth, by a somewhat unusual design.

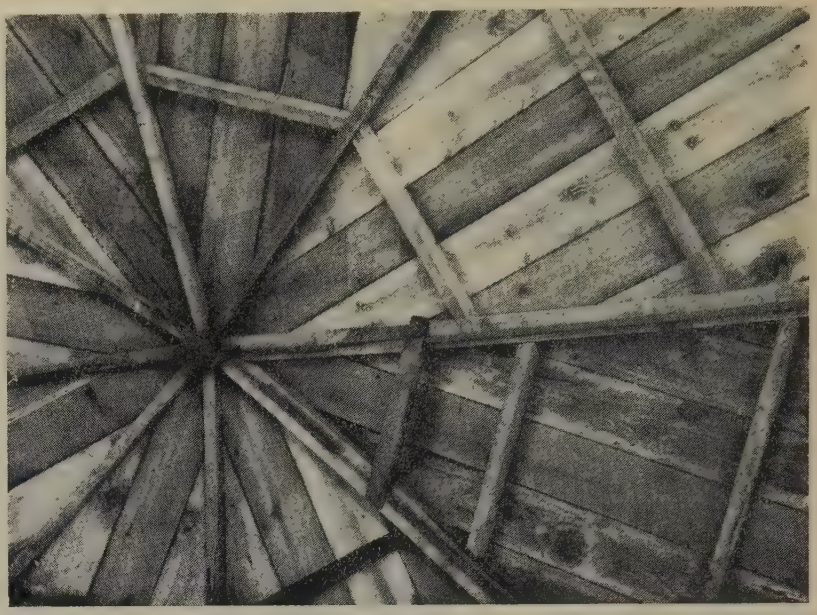
Topping off the filling. Note how the soil excavated from the pit has been utilised as a ramp to reduce the lift.

Preventing Waste

Before starting the construction work, Messrs. Langridge had considered the project from every possible angle. Each year, much potential feed had been allowed to waste for lack of convenient storage facilities, and a long experience of the hazards of wet seasons had shown them the risks of depending entirely on hay. They decided that if the silo were to be of the fullest practical value it must be conveniently and centrally situated, even though this should involve building

rather than digging. In addition, to serve their purpose, large capacity was one of the cardinal essentials. Building in the ordinary way, this involved either a very tall silo, with the attendant disadvantage of a high lift, or an unduly wide diameter, which would expose a proportionally large surface and also entail increased weighting difficulties.

As the silo would be filled only gradually as opportunity arose throughout the season, a large surface would result in a considerable amount of waste. Messrs. Langridge reconciled these difficulties by compromise. They secured height by digging. Before building the tower they excavated a pit about 6 ft. deep and 21 ft. wide. By surmounting this with 14 ft. of the tower, 20 ft. depth of storage was in this way conveniently obtained. In order to reduce the lift, the soil which was excavated when making the pit was heaped on the upper slope to form a ramp. This effectively reduced the lift to truck level, and completely laid the bogey of filling the silo.



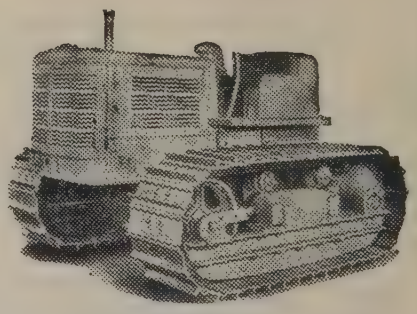
An interior view of the roof. The section with cross cleat on the right can be opened for filling.

Construction

As will be seen from the illustration, the tower throughout has been constructed of concrete. The wall, which is strongly reinforced, is 6 in. thick and was built up in a series of 2 ft.

NEW FARMALLS TRACTRACTORS

By McCORMICK-DEERING



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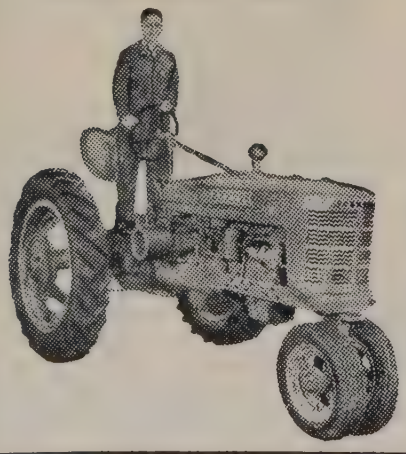

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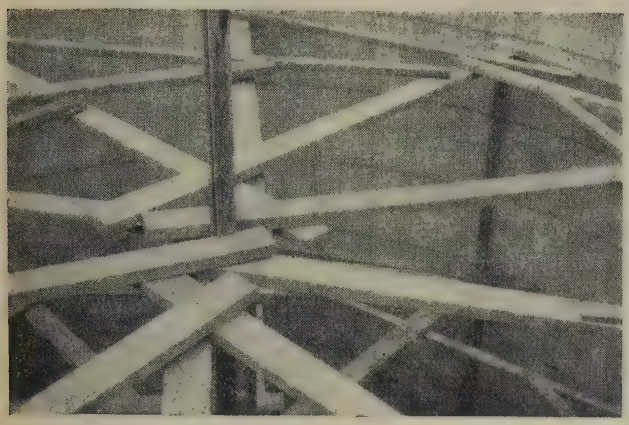

Phases of the construction. Note the elaborate staging in *a* and *b* and the outer mould section with the reinforcing steel in *c*.

sections with the help of a carefully devised system of moulds. The foundation for the wall, which is carried right down to the floor, consists of a layer of concrete 6 in. deep and 18 in. wide, and the floor itself slopes down to a gully trap leading to a drain. The water in this trap effectively seals the vent and prevents the ingress of air and vermin. The inside dimensions of the silo are 20 ft. by 20 ft., and the capacity exceeds 100 tons of silage.

The approximate cost of the silo is as follows:—Cement, 4¼ tons, £17; shingle and sand (32 yards), £20; reinforcing steel, £10; timber, including moulds and roof, £10; paid labour, £15. Total, £72.

As will be seen, apart from farm labour, out-of-pocket expenses amount to about £72, of which £20 went for shingle, as none was available on the farm. Allowing for their own work, the total cost was about £100. This entails an overhead interest charge of only about 1s. per ton.

After a full year's experience with the silo Messrs. Langridge are highly enthusiastic regarding the quality of the silage and the ease with which it can be made. Contrary to what one might expect, although the filling was done in batches, the amount of waste has been relatively slight and did not exceed a layer of about 3 in. between the successive fillings. Judging by samples seen during an inspection, the silage was of first-class quality, and was greedily eaten by the stock. During the past season the silo was completely filled, and practically the whole of it was fed out, with a corresponding benefit to the herd, which has never before come through a winter so well.

Pastures Benefit As Well As Cows

Quite apart from the benefit derived by the cows, Messrs. Langridge emphasise the benefits conferred on the pastures. As careful winter management may be regarded as a keystone in building up and maintaining a highly productive pasture, and as this in turn entails an abundance of supplementary feed, the value of a generous supply of high quality silage in the economy of the farm can scarcely be exaggerated. Herein lies the value of large capacity. Well-made and well-stored silage will keep indefinitely.

An investment which helps to even out the seasonal cycles of alternating superfluity and want so efficiently and for so low a premium can be safely recommended. Just which type of silo will be most suitable for the varying conditions to be found on different farms will of course depend on circumstances, and may perhaps be largely a matter of opinion. Messrs. Langridge, at any rate, are satisfied that they have built both wisely and well, and are confident that their silo will never miss its dividend.

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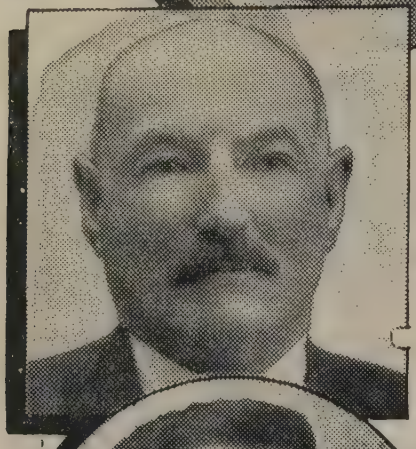

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How Your Milking Machine Works

Importance Of Relief Valves

By W. G. WHITTLESTON,
Animal Research Station,
Wallaceville.

THE relief valve of a milking machine is a fundamentally important part. It is the only guarantee the farmer has that the vacuum in the machine will not rise to dangerous levels. It is, in fact, the safety valve of the milking machine. There are on the market several types of relief valve, and it is proposed to discuss these in the following article. Suggested improvements will be indicated, and the fundamental problems involved in designing a milking machine relief valve will be briefly discussed.

Function of Valve

The object of equipping a milking machine with a relief valve is to ensure some reasonable control over the vacuum in the machine. It should be mentioned that this may be done with some saving in power costs when a piston type vacuum pump is used by using a vacuum reducing valve. As this method is not at present in use to any considerable extent, however, it will not be discussed at length.

The orthodox relief valve is a spring loaded or weighted valve of one of several types, opening to the air. When the vacuum increases to a predetermined value the pressure drop across the valve becomes sufficient to open it against the tension of the spring or weight, thus admitting air into the system and reducing the vacuum. It is evident from the nature of the construction of the ordinary valve that the vacuum will continue to rise after the valve has first opened if the pump is capable of handling enough air. Hence, the efficiency of a given relief valve must be considered in relation to the size and speed of the vacuum pump employed.

A good relief valve would not permit a rise of more than 1 in. after it had opened when working in conjunction with the pump intended for use with it. It is very important to realise that a relief valve which performs satisfactorily on a two-cow plant may be almost useless on a six-cow plant.

Frequently one finds a farmer having difficulty in keeping the vacuum in his machine high enough to keep the cups on during a flush milk flow. Often he will screw up the relief valve, thus causing the desired rise. However, the point overlooked when doing this is the fact that when the rate of milk flow slows up or the number of cows being milked at one time decreases the vacuum will rise, possibly to a dangerous level. The writer has seen a vacuum rise from 15 in. to 20 in. towards the end of milking due to this practice.

If the vacuum falls when the machine is milking there are two important possible causes of trouble. Either there are serious leaks of air into the machine, or the pump is not big enough or is running too slowly. All connections and rubber parts should be inspected. If these prove to be in good order the pump is probably the cause of the trouble. Either it is worn and requires overhauling, or it is not running fast enough.

When a plant is "doubled up" or a new bail is added it is very important to ensure that the pump is capable of handling the additional air. To screw down the relief valve when the vacuum falls is to increase the potential vacuum in the machine and so to endanger any cows milking at a time when little milk is flowing or few sets of cups are on.

Adjusting the Valve

As no relief valve can maintain the vacuum in the machine absolutely steady because of the definite margin between the opening vacuum and the final vacuum, it is evident that a relief valve can be adjusted in two ways. Either the valve is adjusted to blow off at the required vacuum when

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all cows are being milked, or it is adjusted when no milking is being done. If the adjustment is carried out when there is a maximum flow of air in the machine (that is, when all cows are milking freely) it means that as the demand for air decreases the vacuum will tend to rise, the amount of rise depending on the sensitivity and air-handling capacity of the valve and on the capacity of the pump. In other words, the vacuum can rise to an amount higher than the desired vacuum by the vacuum margin of the relief valve.

The alternative (and preferable) method of adjusting the valve is to do so when the machine is idling. This then sets the maximum vacuum. As the demand for air increases the vacuum falls, the amount of fall being determined by the behaviour of the relief valve and the capacity of the pump. Under these conditions, if the vacuum falls noticeably below that vacuum at which the relief valve closes it is evident that either there is leakage of air into the machine or the pump is not handling enough air. It is evident that an insensitive valve will allow the vacuum to fall considerably before closing.

It may be seen from the above that a good relief valve should be capable of handling all the air the pump can exhaust without allowing the vacuum to rise seriously, and it should close promptly when the demand for air increases.

Sensitivity

The sensitivity of a valve is governed by several factors, the most important in practice being the area of the valve on which the atmospheric pressure acts and the size of the spring. There are, of course, constructional details, which will be discussed as they arise. The prior factor, namely, the area on which the atmospheric pressure acts, is the factor which governs the actual amount of force available to operate the valve against the tension of the spring. The sensitivity is actually governed by the ratio between this force and the frictional forces encountered when the valve starts to open. The larger the effective area and the smaller the amount of friction, the more sensitive the valve.

The latter factor—that is, the size of the spring—is also important. When a valve of any type opens against a spring the movement of the valve in compressing or extending the spring causes the force exerted by the spring to increase. The increase in force is directly proportional to the amount of movement (this is the so-called Hooke's Law). This means that when a small amount of air is passing a spring loaded valve and the valve has to open only a small distance in order to admit the air required to stabilise the vacuum, the control of the vacuum is fairly good. However, if a large amount of air were required to keep the vacuum down, such as when no cows are milking, the valve would have to open a considerable distance in order to pass this amount of air. This would cause the tension on the spring to increase. In other words, the vacuum would have to increase in order to open the valve enough to admit sufficient air.

This means in practice that a spring loaded valve will permit a rise in vacuum when the amount of air passed by the valve requires a considerable movement of the spring. The amount of increase in the tension on the spring due to compression or extension is inversely proportional to the size of the spring. In other words, a small spring will give a larger increase in tension for a given amount of movement than a large spring. In effect, this means that for a given size of valve and a given value for force due to friction, the larger the spring the more sensitive the valve.

To sum up: The things to look for in a relief valve are:—(1) A reasonably large area on which the atmospheric pressure can act so that any frictional forces will not seriously affect the efficiency of the valve; (2) an adequately large spring; and (3) a minimum of rubbing surfaces to create friction.

In addition to the above, there are constructional factors which affect the behaviour of a valve. Firstly, it is evident that a spring which corrodes readily is highly undesirable, as such corrosion reduces its elasticity and so reduces the sensitivity of the valve. Secondly, the valve guide, if any, should not become corroded or in any way stiff so that frictional forces tend to increase. Thirdly, there should be no tendency for the valve seat to corrode or to collect dirt and so prevent the valve from closing properly.

Relief valves on the market at present fall generally into three categories:—

(1) Spring loaded ball valves.

(2) Spring loaded poppet valves.

(3) Weighted valves.

There are several other types in use, but as they are not at all widespread they will be only briefly discussed.

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Spring Loaded Ball Valves
(See Figs. 1 and 2.)

Construction

The acompanying sketch and photograph show the construction of a typical ball valve. An adjustable cap (1) screws on to the main body of the valve (2). In the top of the cap is a hole, against which a small metal ball (3) is held by a spring (4). The tension on the spring is controlled by screwing the cap (1) up or down on the main body of the valve, the cap being locked by the threaded ring (5). The valve is attached to the machine by the portion (6).

Action

As the vacuum increases in the machine, the force exerted by the atmosphere on the small ball increases, tending to force the ball against the tension of the spring. When the force on the ball just exceeds the tension of the spring, the ball moves away from its seat, thus opening the machine to the air. Air passes the ball and brings about a reduction in the vacuum in the machine.

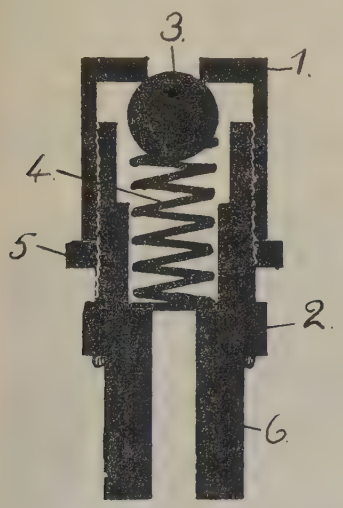

Fig. 1.—Construction of a ball relief valve.

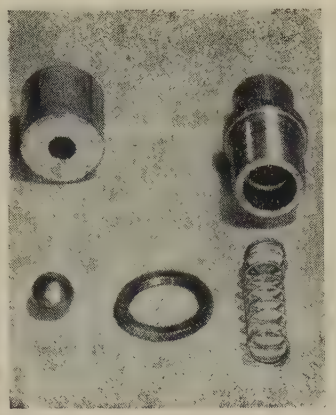

Fig. 2.—Components of a ball relief valve.

In the light of the foregoing discussion on the factors influencing the efficiency of relief valves, the following points should be made about the action of spring loaded ball valves.

As there should be no rubbing parts, the frictional forces upsetting good action are very small indeed. However, the actual area on which the atmospheric pressure can act is very small, so that any friction due to the spring rubbing on the sides of the valve would have a serious effect. Further, the spring is so small that the sensitivity is seriously limited by this factor alone. The spring in this type of valve is placed in the pathway of all incoming air, so that unless it is made of some non-corroding metal the danger of corrosion is very serious. This is increased when the valve is placed in such a position on the milking machine that spray or vapour of any sort can condense on the inside and the spring, thus accelerating any tendency to rust. The small opening in many ball type valves causes unnecessary resistance to the flow of air, causing inefficiency on a medium or large-sized milking plant.

To sum up: A small spring loaded valve is satisfactory only where the amount of air to be handled is not excessive. In other words, one such valve is not adequate on a large milking machine.

Spring Loaded Poppet or Mushroom Type Valves
(See Figs. 3 and 4.)

Construction

The accompanying figure and photograph show the construction of a typical valve of this class. The main

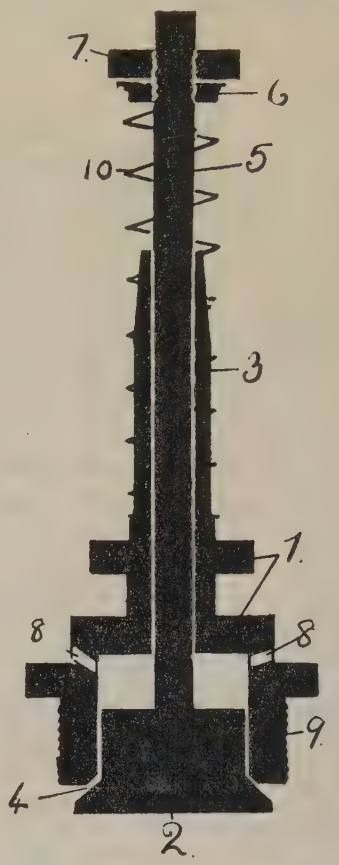

Fig. 3.—Construction of a poppet relief valve.

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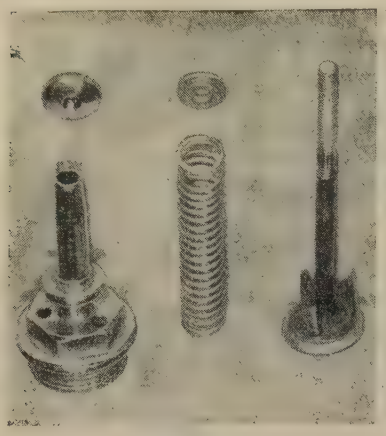

Fig. 4.—Components of a poppet relief valve.

body of the valve (1) is integral with the valve guide (3), the inlet ports are drilled at (8), while the valve fits into the machine by the threaded portion (9). The valve head (2) is attached to the stem (5) by a small pin in such a manner that the head may tilt with respect to the stem. This is done to improve the seating of the valve against the end of the main body at (4). The valve is held closed by the spring (10), whose tension is controlled by the member (6), which is screwed on to the valve stem and locked by the nut (7).

Action

As the vacuum in the machine increases, the force due to atmospheric pressure acting on the valve head increases, thus pulling the stem against the tension of the spring. When the force due to atmospheric pressure just exceeds that due to the spring the valve opens, admitting air into the machine.

From the construction described it can be seen that any friction causing trouble will arise between the valve stem and guide. This is readily overcome by lubrication. As the area of the valve head is considerably greater than that of the ball valve, the force due to atmospheric pressure is considerably greater than in the latter. In a well-made poppet valve this more than offsets the increase in friction due to the stem sliding in the guide, and thus gives a greater degree of sensitivity. The usual design of poppet valve has a reasonably large spring which further contributes to its sensitivity. However, unless the spring is made of non-corroding metal or is oiled to prevent corrosion it may readily become insensitive because of rust. This type of valve is capable of handling relatively large quantities of air, and is satisfactory on the largest plant when it is made of generous proportions.

In general, the points to look for in a poppet valve are a generous size of valve seat and spring, a free-moving valve stem, a non-corroding spring, and a well-fitting seat. Given these and a certain amount of attention paid to cleaning and lubrication, a well-made poppet valve will give as good results as can be obtained at present. In connection with cleaning, the writer has noticed that valves of this type with ports opening into the valve sideways tend to collect quite appreciable amounts of dust behind the valve head.

A word of caution should be added in connection with lubrication. The merest film of oil is required on the valve stem. Too much will cause dust to accumulate or, even worse, oil will get into the vacuum line, to the serious detriment of any rubber connection with which it may come in contact.

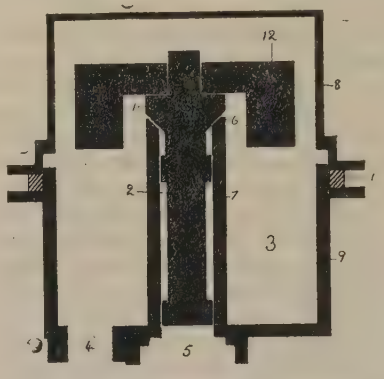

Fig. 5.—Construction of a weighted relief valve.

Weighted Relief Valves

(See Figs. 5 and 6.)

Construction

A weighted relief valve is shown in the accompanying photograph and sketch. The valve (1), which is integral with the guide portion (2), rests on its seat (6) in the main chamber of the device (3), the valve being held closed by its own weight, together with that of the weight (12). The motion of the valve is guided by the portion (2), which maintains the valve centrally in the tube (7), in whose upper end the seat is formed. The valve is attached to the machine by the threaded portion (4), while air passes in via the opening (5). The main

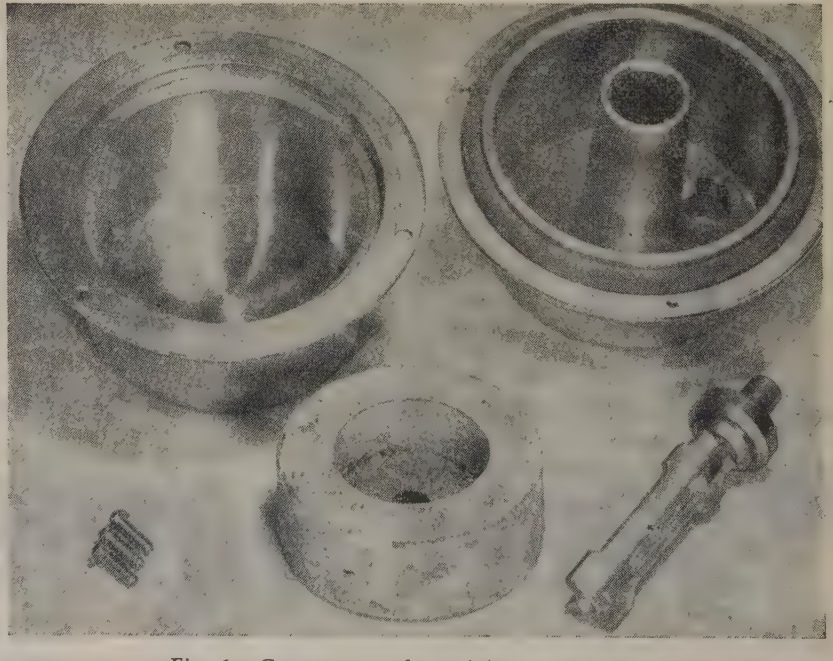

Fig. 6.—Components of a weighted relief valve.

chamber is divided into two portions (8) and (9), the upper portion (8) being readily removeable and making an air-tight fit with the lower portion by means of the rubber ring (10), the two parts being held together by three small bolts. The weight is thus removeable and may be changed by opening the valve chamber.

Action

The general action of this valve is evident from the sketch. Reduction of pressure in the valve chamber causes atmospheric pressure to act on the under-side of the valve, thus tending to lift the weight. When the vacuum in the machine is great enough the valve opens, admitting air.

It is important to notice the difference in action between this type of valve and a spring loaded valve. In the case of a weighted valve in which no friction is encountered there is no increased force on the valve due to opening movement as in the case of a spring loaded valve. This means that the valve can handle air up to its physical limits without causing an appreciable rise in vacuum if there is no frictional force impeding its movement. Valves of this type tend to chatter unless well designed, thus causing a drop in the sensitivity as well as causing undue wear. Further, unless the valve is mounted in a perfectly vertical position the guide will tend to stick.

The most serious objection to weighted valves is the difficulty of adjusting the blow-off vacuum. It is suggested by some that it is advantageous to be able to set the vacuum at an unalterable level. However, until the design of milking machinery has considerably improved it is highly desirable to be able to adjust the vacuum in the machine continuously.

(*To be continued next month*).

Dressing for Leather Harness.

H.W. (WAIROA):—

I have been advised to use waste oil as a dressing for leather harness, collars, etc. I have always understood that mineral oil is not to be applied to leather. Which is correct? Could you supply a recipe for tanning hides?

FIELDS DIVISION:—

Waste oil will not prove a satisfactory dressing for leather harness, collars, etc., as this oil, being of mineral origin, will cause the leather to deteriorate rapidly. Leather requires nourishing, and, being an animal product, requires an animal fat. Neatsfoot oil is by far the best dressing for leather work, but is closely followed by first-grade tallow. A suitable dressing can be prepared on the farm by rendering down pure mutton fat. It is important that this fat be free of all impurities, especially salt, etc.

A suitable recipe for treating hides to obtain quite good quality leather for most farm purposes is as follows:—

Take one bucketful of burnt lime mixed with enough water to cover the hide in a barrel or large milk or cream can. Soak the hide in this for ten days, turning frequently; then take out and spread on a floor (concrete for preference) hair side up, and scrape off the hair. After taking off all the hair, soak for two days in a bucketful of bran with water to cover; this will clean up the hide. Next soak for ten days in a solution of 10lb of salt, 10lb of ground alum, and 1oz of oxalic acid, mixing the materials together with sufficient water to cover the hide. Turn the hide frequently. Then tack hide on wall and stretch it as tight as possible. When dry, rub on neatsfoot oil and two days later turn over and treat the other side with neatsfoot oil. This will make the hide more pliable.

The treatment of a hide to make a "chrome sole" green hide finish, or to tan the hide to give the equivalent of a commercial tanning is a rather complicated process, and is more often than not a failure when performed under farm conditions. The cure recommended above will give suitable leather for all practical farm purposes.

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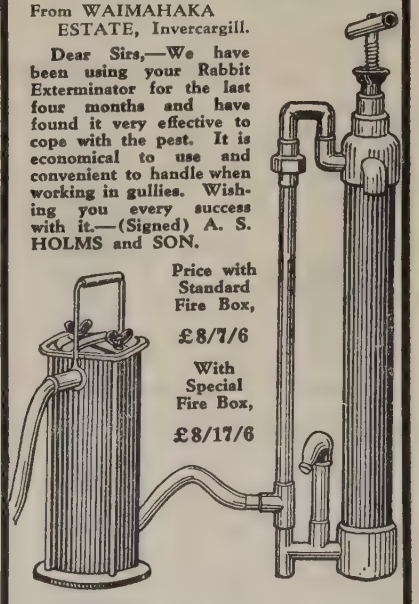

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Lambing Estimates for 1940

Highest Percentages Since 1936; Increase of Three-quarters Of a Million Lambs

Contributed by the LIVESTOCK DIVISION.

The estimated lambing percentage for the Dominion for the current season is 90.21—the highest since 1936, when the figure was 90.32. Although the number of breeding ewes is slightly less than last year, it is estimated that there will be an increase of more than three-quarters of a million lambs over last year's total.

The Dominion experienced a most favourable season during the autumn and winter for lambing both from a climatic and feed point of view, and substantial increases over last year's figures are recorded in several districts, notably Otago-Southland with 94.36 per cent. Auckland with 92.41 per cent., and Hawke's Bay with 87.86 per cent.

County.	Breeding Ewes.	Estimated Percentage of Lambs.	Estimated Number of Lambs.
Auckland District.			
Mangonui	32,267	65.00	20,974
Whangaroa	13,279	79.00	10,490
Bay of Islands	56,422	85.20	48,072
Hokianga	54,147	79.70	43,155
Whangarei	97,036	86.23	83,674
Otamatea	70,354	82.79	58,246
Hobson	70,287	83.50	58,690
Rodney	76,581	79.70	61,035
Great Barrier	6,626	72.60	4,810
Waitemata	65,645	90.10	59,146
Eden	2,409	102.70	2,474
Manukau	57,893	100.00	57,893
Franklin	83,873	102.00	85,550
Coromandel	39,832	81.30	32,383
Thames	9,854	78.10	7,696
Hauraki Plains	9,762	103.74	10,127
Ohinemuri	12,702	91.93	11,677
Waikato	116,768	97.60	113,966
Raglan	313,639	94.31	295,792
Waipa	137,932	107.44	148,194
Piako	95,012	102.10	97,007
Matamata	156,051	100.00	156,051
Rotorua	56,635	101.00	57,201
Taupo	15,919	93.00	14,804
Taumarunui	88,407	86.91	76,835
Kawhia	56,975	95.40	54,354
Otorohanga	96,622	94.05	90,873
Waitomo	277,979	95.00	264,080
Ohura	101,911	91.04	92,780
Kaitieke	56,747	77.54	44,002
Tauranga	66,934	94.65	63,353
Whakatane	34,493	88.47	30,516
Opotiki	51,611	74.30	38,347
Totals	2,482,604	92.41	2,294,247
East Coast-Hawke's Bay District.			
Matakaoa	64,550	74.64	48,180
Waiapu	256,187	75.87	194,369
Uawa	125,578	83.08	104,330
Cook	449,169	87.20	391,675
Waikohu	369,698	82.56	305,223
Wairoa	401,536	86.14	345,883
Hawkes Bay	912,649	88.00	803,131
Waipawa	385,143	94.00	362,034
Waipukurau	128,782	96.00	123,631
Patangata	494,193	88.00	434,890
Weber	54,230	93.00	50,434
Dannevirke	260,197	93.00	241,983
Woodville	78,319	94.00	73,620
Pahiatua	154,846	97.00	150,201
Akitio	158,073	90.00	142,266
Totals	4,293,150	87.86	3,771,850
West Coast-Wellington District.			
Clifton	66,597	92.27	61,449
Taranaki	16,156	113.38	18,318
Inglewood	36,414	95.17	34,655
Egmont	17,250	106.44	18,361
Whangamomona	46,588	86.70	40,392
Stratford	78,332	90.00	70,499
Eltham	48,231	98.05	47,290
Hawera	73,565	99.43	73,146
Waimate West	6,709	102.61	6,884
Patea	196,298	98.50	193,354
Waitotara	133,562	90.60	121,007
Waimarino	164,200	89.00	146,138

County.	Breeding Ewes.	Estimated Percentage of Lambs.	Estimated Number of Lambs.
West Coast-Wellington District—Cont.			
Wanganui	280,108	95.90	268,624
Rangitikei	931,348	98.00	912,721
Oroua	198,908	107.00	212,832
Kairanga	105,980	104.90	111,173
Kiwitea	224,175	96.00	215,208
Pohangina	116,161	99.00	114,999
Manawatu	137,355	108.80	149,442
Horowhenua	110,786	95.20	105,468
Hutt	74,716	80.00	59,773
Makara	46,997	88.00	41,357
Featherston	312,897	80.07	250,537
Wairarapa South	158,654	91.47	145,121
Masterton	287,221	87.67	251,807
Castlepoint	93,787	86.33	80,966
Eketahuna	133,953	84.62	113,351
Mauriceville	44,982	82.38	37,056
Totals	4,141,930	88.16	3,651,391
District Totals.			
Auckland	2,482,604	92.41	2,294,247
East Coast-Hawke's Bay	4,293,150	87.86	3,771,850
West Coast-Wellington	4,141,930	88.16	3,651,391
Marlborough-Nelson-Westland District.			
Waimea	167,463	79.57	133,250
Takaka	26,958	82.61	22,270
Collingwood	12,448	80.66	10,041
Buller	2,684	94.30	2,531
Inangahua	12,621	105.20	13,277
Murchison	31,596	97.20	30,711
Grey	25,403	109.10	27,715
Westland	35,936	114.30	41,075
Sounds	101,668	76.42	77,695
Marlborough	200,887	81.94	164,607
Awatere	208,501	87.73	182,918
Totals	826,165	85.46	706,090
Canterbury-Kaikoura District.			
Kaikoura	111,550	80.00	89,240
Amuri	231,259	73.00	168,819
Cheviot	146,936	88.00	129,304
Waipara	288,763	87.60	252,956
Ashley	65,502	75.30	49,323
Kowai	64,470	89.90	57,959
Oxford	73,059	84.00	61,370
Rangiora	30,540	94.00	28,708
Eyre	47,551	103.00	48,978
Tawera	55,150	83.00	45,775
Malvern	120,579	93.00	112,138
Paparua	29,411	105.50	31,029
Waimairi	4,443	99.00	4,399
Heathcote	9,370	87.00	8,152
Akaroa	88,065	81.00	71,333
Mt. Herbert	42,758	94.00	40,193
Wairewa	74,140	99.00	73,399
Halswell	13,747	91.00	12,510
Springs	26,039	104.00	27,081
Ellesmere	81,017	103.00	83,448
Selwyn	150,764	110.00	165,840
Ashburton	692,613	94.09	651,680
Geraldine	241,955	81.00	195,984
Levels	155,681	103.30	160,818
Canterbury-Kaikoura District—Cont.			
Mackenzie	312,659	80.00	250,127
Waimate	450,161	96.00	432,155
Chatham Islands	43,979	73.00	32,105
Totals	3,652,161	89.94	3,284,823
Otago-Southland District.			
Waitaki	445,681	90.66	404,054
Maniototo	251,476	82.00	206,210
Vincent	248,496	82.66	205,407
Waihemo	102,690	82.00	84,206
Waikouaiti	70,138	95.50	66,982
Taieri	164,974	83.50	137,753
Peninsula	15,745	106.50	16,768
Clutha	372,195	97.66	363,485
Tuapeka	316,135	89.66	283,447
Bruce	208,945	91.50	191,185
Lake	127,193	78.50	99,847
Southland	1,468,536	105.25	1,545,634
Wallace	537,609	89.50	481,160
Stewart Island	1,834	80.00	1,467
Totals	4,331,647	94.36	4,087,605
District Totals.			
Marlborough	826,165	85.46	706,090
Canterbury	3,652,161	89.94	3,284,823
Otago-Southland	4,331,647	94.36	4,087,605
Dominion Totals			
North Island	10,917,684	89.01	9,717,488
South Island	8,809,973	91.69	8,078,518
Dominion Totals	19,727,657	90.21	17,796,006

The following table shows the estimated lambing for the North and South Islands for the previous five years, together with the actual number of lambs tailed:—

Year.	Number of Breeding Ewes	Estimated Percentage of Lambs.	Estimated Number of Lambs.	Actual No. of Lambs Tailed.
North Island.				
1940	10,917,684	89.01	9,717,488	——
1939	10,889,802	84.40	9,190,794	9,510,608
1938	10,735,829	80.11	8,600,625	9,068,701
1937	10,570,388	86.52	9,145,849	9,401,496
1936	10,300,826	90.50	9,322,476	9,423,240
1935	9,697,231	83.68	8,114,361	8,500,075
South Island.				
1940	8,809,973	91.69	8,078,518	——
1939	9,070,497	86.29	7,826,601	7,718,961
1938	8,928,037	90.10	8,044,540	7,880,278
1937	8,761,689	91.35	8,003,668	7,939,418
1936	8,368,135	90.10	7,539,576	7,442,781
1935	8,115,186	89.45	7,259,281	7,196,542
Dominion.				
1940	19,727,657	90.21	17,796,006	——
1939	19,960,299	85.26	17,017,395	17,229,569
1938	19,663,866	84.64	16,645,165	16,948,979
1937	19,332,077	88.71	17,149,517	17,340,914
1936	18,668,961	90.32	16,862,052	16,866,021
1935	17,812,417	86.31	15,373,642	15,696,617

Training Boys at Flock House

FLOCK House Station is situated in the Rangitikei County, nine miles from Bulls, near the mouth of the Rangitikei River. The Station was established as a farm training centre for overseas boys in 1924 by the Trustees of the New Zealand Sheep-owners' Acknowledgment of Debt to British Seamen Fund, and was acquired by the Government in February, 1937.

The course of training is open to boys of from 14½ to 18 years of age who have passed the necessary medical examination and are of good character.

The general aim is to give an initial training in all branches of farming, make a boy self-reliant, instil a sense of responsibility, and generally to give him a decent outlook on farm life.

The term is for twelve months, and applicants may enter at any time of the year.

There is no fee, the only cost being that of the regulation clothing outfit, a list of which is given later. Half a crown per week is paid as pocket money, one shilling of which is paid direct to the trainee, and one shilling and sixpence retained against cost of transit from Flock House to his home and place of employment.

The Department of Agriculture undertakes to find suitable employment for each boy on completion of his training.

Application for entry should be made to:—

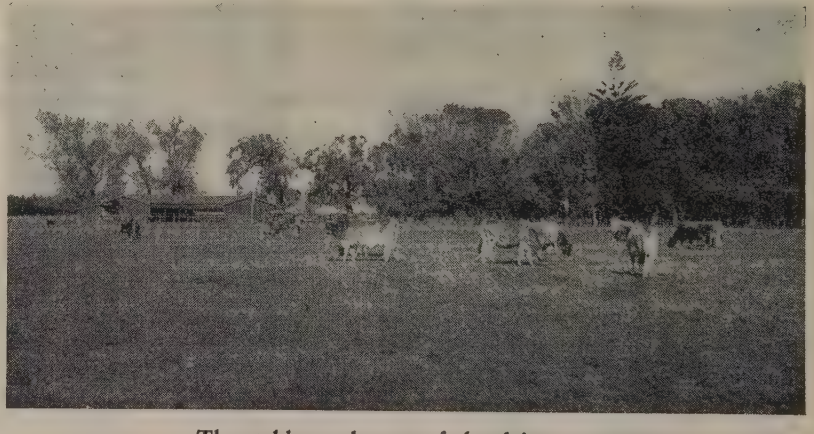
The Director of the Fields Division,
Department of Agriculture,
P.O. Box 3004, Wellington, C1.

The property comprises approximately 8000 acres lying between the Rangitikei River and the coast, and varies from rich alluvial flats along the river frontage to typical sand dune country along the coast. Approximately 6000 acres are stocked, the balance being devoted to an afforestation scheme.

The property is farmed as far as practicable along commercial lines, due regard being given to the initial purpose of training.

Tuition is principally along practical lines, supplemented by lectures by the staff and officers of the Fields Division.

The hostel buildings.



The stables and some of the dairy cows.

The Dutch barn and oat stacks.

The farm buildings, tools, and implements are not other than would be found on any well-equipped property of similar size and farmed on intensive lines.

Horses

Good-quality draughts are bred on the farm, and also suitable hacks.

Cattle

There is a herd of approximately 90 good-type Jerseys and the usual young stock. About 1000 head of well-bred Aberdeen Angus cattle are run. These include a breeding herd of 350 cows. All steers are fattened on the property. A small stud herd is also kept.

Sheep

Approximately 9000 sheep are wintered, including 6500 ewes bred to Romney and Southdown rams, ewe lambs from the former being retained for replacements to the ewe flock, and wether lambs and Southdowns fattened.

Pigs

Purebred Berkshire sows are bred to the Tamworth, and all pigs fattened.

Accommodation

Trainees are accommodated in the hostel, a two-storied concrete building set in ideal surroundings. Dining rooms, etc., are situated in an up-to-date annexe, the whole being lit by electric light.

When off duty the boys are under the supervision of a housemaster, the domestic arrangements being in charge of a matron, who is a fully qualified nursing sister. The food is good and ample.

Trainees dagging the hoggets.

Recreation

This is under the direction of the housemaster, and is well catered for. There is a large recreation hall adjacent to the hostel, where a weekly cinema is held, and also dancing and indoor games. There is a good swimming bath, cricket and football field, and a nine-hole golf course.

Religious services are held every Sunday.

Rules and Regulations

Trainees must conform to the rules, which will be strictly enforced. Any wilful damage will be charged against the trainee concerned.

List of Clothing Required

Khaki shirts, 3*; denims (trousers), 3*; work coat, 1; oilskin, 1; work boots, 1 pair; towels, 3; grey shirts, 2*; grey trousers, 2*; pyjamas, 2*; singlets, 2; best shoes, 1 pair; sand shoes; bathers; pull-over; best sox; working sox, 6 pairs*; handkerchiefs, 6; laces, leather and cotton, 3 each; overcoat; best suit; hussif; boot outfit; brushes, hair, clothes, tooth; comb; pad and envelopes; ties; braces; belt; cap or hat; blankets, 2; rug, 1; sports coat; coat hangers; best shirts; gum boots, knee, have been found to be very useful. Items marked * will require renewing at end of about eight months. The work boots to be military type, not too heavily nailed.

The shepherds start out.

Making Reverted Superphosphate

A.A.T. (NORTH CANTERBURY):—

I have on hand 3 tons of superphosphate and I want to change this into reverted super for the next rape crop to be sown in November. How is it done? Probably this question and answer would interest many farmers.

FIELDS DIVISION:—

Reverted superphosphate (or basic superphosphate) is made by mixing 85 per cent. of superphosphate with about 15 per cent. of very finely-ground carbonate of lime, using water to damp the mixture in some cases, and in others, slaked lime in the same proportion is employed.

Reverted super is quite satisfactory for use as a fertiliser for the rape crop, as is also a mixture of equal parts of lime and superphosphate mixed a day or two before being required for use.

Veterinary Notes for the Farmer

Discussions on First-Aid Measures

Contributed by the Livestock Division

Watch Out for Blowfly Strike in Sheep

Here is an article of particular seasonal importance to sheep farmers. It is possible that blowfly strike will shortly prove troublesome, and farmers are urged to adopt all precautionary measures and to examine the lambs perodcally to detect recently-struck anmals.

TO the sheep farmer blowfly strike periodically becomes an acute problem, particularly on the higher country. At the present time, following the recent heavy rains in the central parts of New Zealand, sheep farmers in Hawke's Bay, Marlborough, and especially in the Wairarapa districts, should periodically examine the lambs to detect recently-struck animals. The recent rains will have stimulated a growth of feed, and the general tendency will be towards a looseness of the bowels, if not actual scouring.

Any staining of the wool of the crutch, whether from urine or scour, is liable to be struck when the flies are active. Urine stains of the wool and skin, together with the breakdown products on the surface of the skin, attracts the egg-laying fly. In muggy weather the warmth and moisture necessary for the hatching of the eggs and the growth and development of the maggot are most suitable, so that the strike of individual animals soon becomes apparent.

Prevention Important

Investigation has shown that sheep of the Merino and half-bred flocks are more liable to staining and more susceptible to strike because of the wrinkling and folds of the skin; the plain bodied sheep are less susceptible. However, when it is considered that a single fly may lay 1,000 to 1,200 eggs and that several generations may develop in one summer, it will be seen

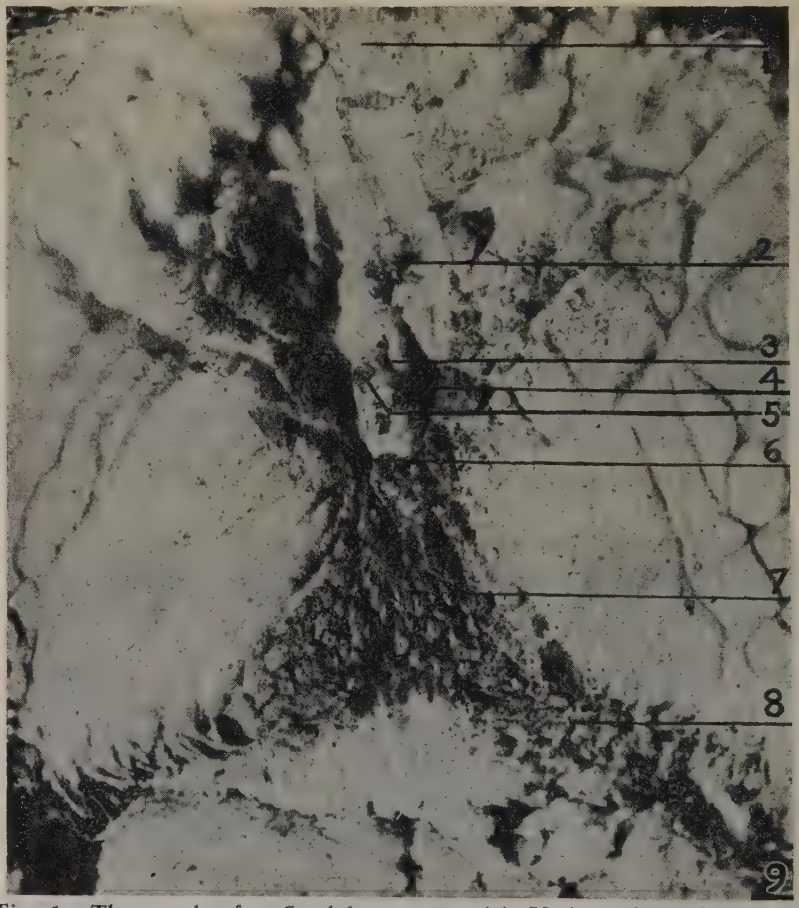


Fig. 1.—The crutch of a Southdown ewe. (1) Under-surface of tail with broken skin; (2) anus; (3) irregular thickened labia; (4) tip lost; (5) scabs; (6) urine staining and dermatitis; (7) pus and dermatitis under wool; (8) lateral extension of broken skin and urine stain; (9) sheep's leg.

how important it is for all owners of sheep, irrespective of breed, to adopt all measures possible to prevent susceptible animals from becoming "blown" or "struck."

In New Zealand the flies responsible for strike are the yellow-brown, hairy species and, less commonly, the bronze-green species. The blue bottles and the striped field flies do not blow living sheep, but confine their activities to dead animals. On the other hand, the striking flies may propagate readily on dead carcasses in the absence of suitable live animals. This brings out the fundamental importance of the deep burial or burning of all such carcasses.

It would appear more important to prevent the breeding of the fly than to set traps or adopt other methods of destruction if breeding remains uncontrolled. As it is not possible to find every carcass for burial or burning, especially when dead rabbits, hares, birds, etc., provide suitable breeding grounds, some other methods of attack aiming at prevention have been given consideration and trial.

Precautionary Measures

Probably the most important line of prevention is the prohibition of the conditions in our sheep which attract the egg-laying fly. To prevent strike on the breech, an early crutching of all lambs in late December or early January is necessary, followed by a further recrutching, depending on the weather and feed conditions. Extreme care should be taken not to cause skin injuries during crutching, as even small wounds will attract the fly.

Jetting with calcium arsenite solution has been found a useful preventive in Australia, but crutching is the more suitable procedure in this country. Jetting cannot be combined with crutching, as the possibility of the arsenic being absorbed through crutch wounds is too well known. Jetting is carried out in Australia after all wounds have healed, and is considered more economical than a second re-crutching.

Fig. 2.—The vulva of a Merino ewe. (1) Urine-stained wool; (2) lower (left) labium; (3) twisted tip.

All wounds in sheep, including foot-rot, should be dressed and treated in the usual way to prevent them being "blown" by the fly.

The affected lamb or hogget will be found dejected, away by itself, probably along the fence line or under cover of a tree. A blackish, moist area may be seen on the rump from a distance, but it is necessary to catch and examine all suspected animals at close quarters.

Treatment

Treatment consists of clipping off the wool around the area where the maggots are operating. It is necessary to see that all maggots are killed and removed, otherwise a few may have escaped and operate in and form a second wound. Boric acid and glycerine prepared by heating 3 lb. of boric acid in one gallon of pure glycerine forms a very good although rather expensive dressing for fly wounds. It kills the maggots, assists the healing of the wound, and tends to prevent a second strike until complete healing has taken place.

Cheaper dressings which are effective for destroying the maggots are:—(1) A 5 per cent. solution of zinc sulphate in water, or (2) a 4 per cent. mixture of carbolic crystals in whale oil. Boric acid powder alone may be dusted on. A 2 per cent. solution of liquid carbolic sheep dip or similar disinfectant is effective in driving out maggots, but it is wise to follow up with an oily application, using lubricating or whale oil. Kerosene or bluestone should not be used.

Finally, it may be mentioned that certain paddocks appear to favour the operation of the fly. A change of paddock and moving the sheep into the open, level paddocks and away from cover or steep faces is worth consideration.

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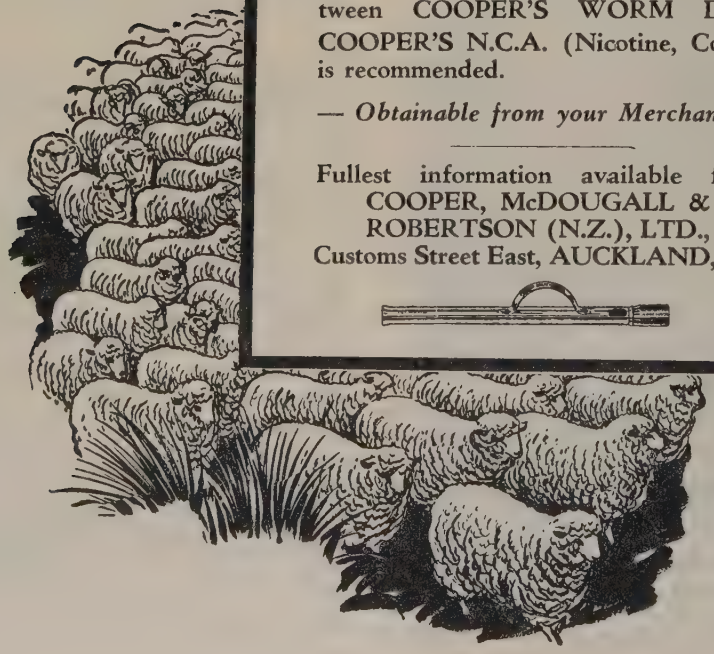


Dosing is often as important as dipping!

Yellow Stain in Wool

A YELLOW stain or band marking the wool staple in sheep or lambs wool, and which cannot be extracted, is frequently noticed in various parts of New Zealand. This stain most commonly lies about the middle of the staple, and may be just a narrow band or marking, or it may involve about half of the staple. This is a definite flaw in the wool, and causes a distinct depreciation in its value.

A sample of this wool, on being submitted to the Animal Research Laboratory, Wallaceville, Department of Agriculture, elicited the following very interesting statement:—

"On being submitted to cultural examination, chromogenic (colour-forming) bacteria were isolated, which were responsible for the discolouration. Members of the bacterial genus, Chromobacterium, producing yellow, red, or violet pigment, are commonly found in water and soil, and consequently are frequently present in the sheeps' fleece. They are capable of proliferating and producing pigment only under certain conditions, such as a constantly moist fleece with humid atmospheric conditions. The essential condition for such discolouration of wool is sufficient moisture to maintain the fleece in a constantly damp state for from four to six weeks. Such a condition occurs following continuous showery weather, with warm atmospheric temperatures. A wool staple of at least four to five months' growth provides the most satisfactory conditions, with moisture, for bacterial growth."

—*A. J. THOMPSON, Veterinarian, Ruakura.*

* * *

Further Comment

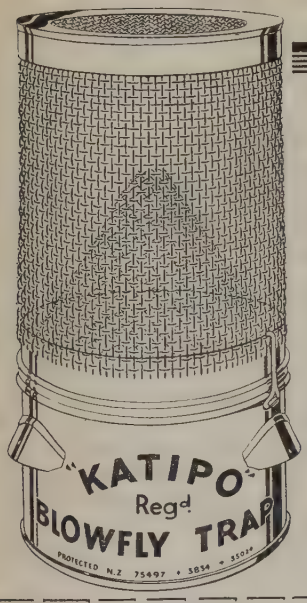
IN the above paragraph the yellow staining referred to is probably what is generally termed "canary stain" in the wool trade. Although it has been widely recognised for some years, its nature is still not fully understood. It is fairly certain that bacteria play a prominent part and that the requisite conditions of humidity for their development are necessary, but it seems that there must be other factors involved in addition, because all the sheep throughout a flock are not necessarily similarly affected. One of the most likely additional factors is the nature of the yolk and suint secreted by the skin. If either of these fractions is abnormal in any way it may favour bacterial action and development of the pigment.

The reason why canary stain depreciates the value of the wool is that it cannot be removed by scouring, and consequently such wool is limited in use to the production of dark coloured materials.

The other colours mentioned in the Wallaceville report—red and violet—and even blue and green have all been occasionally encountered in wool, although most of them are very rare and consequently of little or no economic importance. There are no remedial measures, and all that can be done for prevention is, firstly, to aim at a type of fleece which might be termed well "thatched" (that is, the staple arrangement is such that it tends to run water **off** rather than **into** the fleece, particularly along the back), and secondly, to maintain the health of the flock at as high a level as possible by practising the ordinary recognised methods of good husbandry.

Finally, canary stain should not be confused with the much more widely distributed "golden" colouration. Some degree of yellow or "golden" colouration appears to be naturally associated with certain kinds of wools, more particularly the coarser types. This pigment seems to be associated with the suint (sweaty material in the fleece), and because this is water-soluble the colour is easily removed in scouring. This fact serves to distinguish it from canary stain in any case of doubt, although in general the canary stain is easily identified by its much brighter shade of yellow.

—*J. E. DUNCAN, Wool Instructor, Wellington.*



TRAP THAT BLOWFLY!

The disgusting and dangerous blowfly pest will do costly damage amongst sheep this summer unless checked NOW.
By far the most effective method of eliminating them, and of preventing blowfly strike, is by trapping them in the KATIPO BLOWFLY TRAP.
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Answers to Correspondents

Flies in the Milking Shed.

H.F.A. (HUNTLY)—

I shall be greatly obliged if you could give me advice on how to overcome flies worrying cows during milking, particularly in the evening, during the autumn months. Last season from the beginning of February and most of March I had the flies that bad

that it was almost impossible to milk the cows. The cows' legs and sides were covered with them, and when they got in the bail they kicked and fidgeted and in lots of cases wouldn't give their milk. Even really quiet cows were affected.

I have experienced this trouble before, but usually only the first few cows milked were troubled with them, and then it was only a matter of the cow kicking the cups off and being a bit restless, and in a few minutes would settle down and give no more trouble throughout the milking. This resulted in a decrease in production, in spite of the fact that I had plenty of feed for the cows.

I tried quite a lot of things to overcome it, including spraying with patent fly killers, and although it helped matters for a few minutes, I had to spray the flies on the cows for at least a minute before they dropped off.

Before the cows came into the shed there was hardly a fly to be seen anywhere near the shed. The cows brought them in from the paddock; in fact, as the herd came in they were enveloped in a cloud of flies. I think that paspalum seed heads are the chief source of the flies, particularly when they are affected with that disease that makes them all sticky, and that the cows walking through the paspalum get this sticky substance on them, which attracts the flies more than usual.

If you are able to suggest any remedy to overcome this trouble I shall be greatly obliged.

LIVESTOCK DIVISION—

It is probably the common stable fly, *Stomoxys calcitrans*, which is troubling your cows. These flies breed in moist accumulations of straw, chaff, cow or horse manure, and various fermenting vegetable substances. Any such accumulation should be removed from the vicinity of the shed.

Certain washes are recommended, but as a rule have to be applied frequently and do not keep flies away for more than a day or two following their application.

One pound of lard and one half-pint of kerosene mixed thoroughly until a creamy mass forms and rubbed not too thickly over the backs with a cloth or the bare hand is considered good.

Another wash is:—Soap, 1 lb., water, 4 gallons; crude petroleum, 1 gallon; powdered naphthalene, 4 oz. Dissolve the soap in water and the naphthalene in the crude oil and mix the solutions. This should be done **thoroughly** and energetically. It must be well stirred before being used, and may be applied once or twice a week with a brush.

Prevention of Bloat

"HOKIANGA" (RAWENE):—

I am troubled with bloat in spring. Do you think I would be wise to cut either the super or the lime out for one year; if so, which do you advise to cut out?

LIVESTOCK DIVISION:—

If the grazing of the paddocks is controlled during the winter, allowing the rye to compete with the clover, and precautions are taken during the early flush of grass until the animals become accustomed to it, then the withholding of lime and super is not advisable, as for the sake of a comparatively short period the pastures will suffer for the greater part of the season.

The question is a matter of stock and pasture management designed to reduce the risk to the lowest point consistent with adequate feeding to maintain maximum production. The actual practice followed on individual farms will depend on the available feed supply. Bloat is less likely to occur in cattle that have wintered well, owing to their digestive system being in a strong and healthy condition and consequently more able to deal with the excessive and sudden gas formation in bloat.

The following precautionary measures are advised:—

(1) Do not turn cows in the morning on pasture containing much clover until the dew is off the grass.

(2) The feeding of hay in racks in or about the milking yard.

(3) Keeping a close watch on cows when first turned on pasture.

(4) Allowing cows on pasture for

Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

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"UDIP" is definitely a high quality Dip—it mixes readily in cold water and saturates the wool quickly, thoroughly, and effectively.

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80/- PER CASE (100lbs.) in 10 Sisalkraft Air and Waterproof Containers, each 10lbs. (Subject to freight from main centres.)

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a short period to begin with, extending the time daily.

(5) The cutting and wilting of pasture 12 hours before feeding.

Treatment is as follows:—

(1) In extreme cases, puncturing of the rumen with a trocar and cannula; if this is not available, a long narrow blade knife may be used. After insertion this should be turned in the wound to allow the escape of gas.

(2) Drenching with 2 oz. of oil of turpentine in a pint of raw linseed oil, or ¼ lb. of baking soda in a quart of cold water.

(3) Passing of a stomach tube through the mouth to the rumen to allow free passage of imprisoned gases.

(4) The insertion of a gag, smeared with grease or tar, in the mouth.

Deaths of Yearling Cattle

M.M. (WAIPUKURAU):—

I wintered 150 weaner cattle (Hereford A.A. Cross) on 490 acres of hill country, the sheep stocking being hoggets. This country is in two paddocks, and I have always wintered about the same number of hoggets and weaners there with good results, except one wet winter after I had had the cows and calves out grazing, on poorer quality feed during a dry summer and autumn. This last winter I ran 58 two-year heifers in calf with the weaners, and this possibly overstocked the paddocks. However, the two-year heifers wintered better than any other cattle on the place, and came through the winter in good order.

I had been very busy and was not out in these particular paddocks in the late winter, but on September 18 I found a number of yearlings dead and others looking pretty tucked up. We shifted the lot except a few that wouldn't travel on to a good top-dressed paddock on October 1. The bulk of the cattle seemed to have improved since, but two or three here died, and there are a number due to die yet. One or two have a lump under the jaw as is seen in T.B. cases, and others are thin, some scouring but others not noticeably so. Two I have found down during the last few days had no hair from their hooves up past the fetlock joint, with sores on the skin there, but I put this down to a kind of mud fever following a very wet winter.

Some of the yearlings were too far gone when shifted to expect them to recover in a hurry, if at all, but, as the bulk of them did not improve as well as I had hoped, I was wondering if there was anything that could be done to stop the rot. I imagined that drenching may have improved them when they were shifted, but I relied on the good feed and the prospects of warmer weather doing the trick.

I am inclined to blame the very wet winter and consequent soft feed (there was a noticeable absence of sunshine during winter) for the start of the trouble, and blame myself for not noticing it in time afterwards. There will probably be a 20 per cent. loss to be faced in these cattle, whereas of 500 or more that are usually run on the place the losses often don't reach double figures.

However, I am just wondering at this stage whether anything more can be suggested other than good feed and a bit of time to get over the trouble.

LIVESTOCK DIVISION:—

The losses were no doubt due to worm infestation, as one or two other instances of mortality in Aberdeen Angus yearlings which have been investigated have evidently resulted from heavy parasitic invasion.

It is probable that routine drenching with a reliable worm remedy would have greatly reduced the losses, and, even if carried out after the first deaths, would have enabled the balance to throw off the infection more quickly. The swelling below the jaws is not uncommon as result of the debility and impoverished blood. The two-year-old heifers, being more resistent to parasite infection, would be less likely to suffer. No doubt the season, and also the closer grazing, both resulted in the yearlings getting a bigger dose than usual.

If the yearlings are still hanging fire, improvement would still result from drenching. I presume you have a lick available for them.

While the season remains wet, the feed position should still be watched, as the yearlings will do better on the drier areas where feed is not making such strong growth. As they may still be somewhat debilitated, care should be taken in driving them not to bustle or hurry them unduly.

Lumps on Pasterns Of a Filly

H.C.M. (WAIHI):—

I have a two-year-old filly, and about three months ago a couple of wart-like lumps appeared on her hind pasterns about an inch in circumference. She was running in a paddock with a good deal of blackberry, and the lumps soon became raw and grew to the size of hen eggs. I removed her to a clear paddock, but she did not improve. I tried putting on bluestone and Stockholm tar and the lumps certainly reduced, but she is far from right yet. What would you advise me to do? One of the lumps is on the outside of the near pastern and the other on the inside of the off.

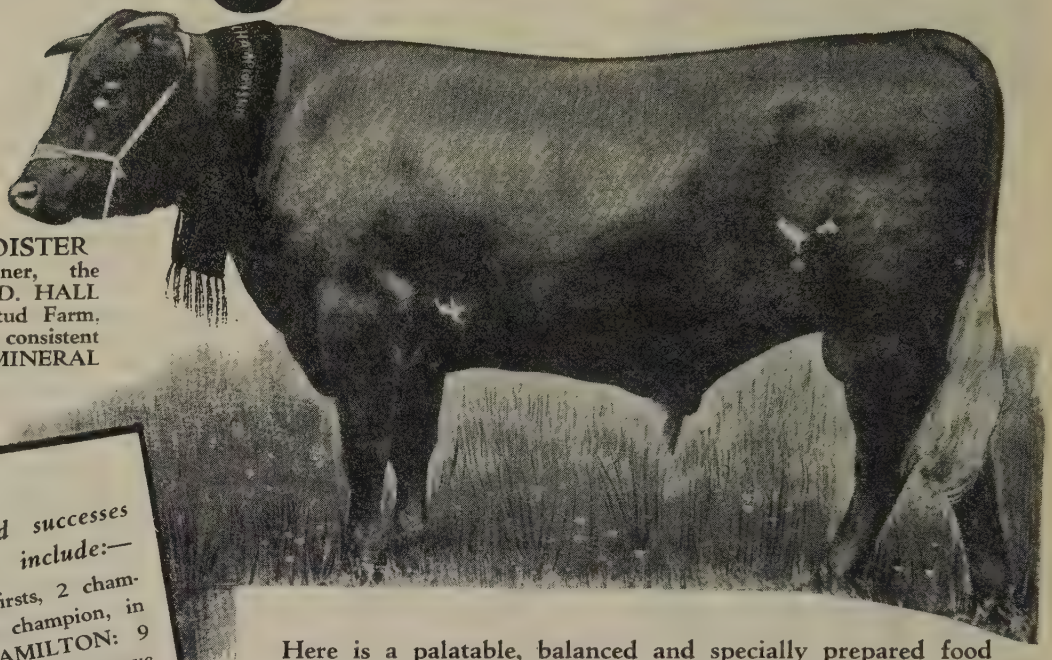
LIVESTOCK DIVISION:—

It appears from your description of the growths that they are of the nature of warts or papillomata. Growths of this nature are frequently seen in young animals, more commonly on cattle than on horses. They may appear on any part of the animal, and are frequently seen on cattle around the head and neck, and even under the abdomen near the udder. In cattle and horses the growths are generally of a benign or harmless nature.

The treatment recommended for the removal of the growths consists of surgical measures or the removal of the growths by the application of some astringent cauterising agent. If the animal is cast and properly controlled it will be an easy matter to remove the growths by using a clean, sterilised knife and cutting off the growth on a level with the surrounding skin. If you do not wish to use a knife the growths may be removed by using a hot searing iron for the purpose. The latter method is probably the better one in this case, as the hot iron will prevent unnecessary haemorrhage which follows the use of a knife. The growths are generally very vascular, and rather severe bleeding sometimes follows surgical removal until it is controlled.

On the other hand, you may prefer to continue using your ointment of tar and bluestone, with an occasional dusting of the finely-powdered bluestone applied directly to the raw bleeding surfaces. This treatment will effect the same result, but is slower in operation. The growths require to be cut down to the level of the surrounding skin, when the wounds are allowed to heal under the usual antiseptic treatment.

MORE Champions!



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"Pinedale" Stud successes during 1939-40 include:—
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Here is a palatable, balanced and specially prepared food that is easily digested and assimilated; that furnishes desirable ingredients to compensate for *POORNESS OF PASTURE OR ANY MAJOR SOIL DEFICIENCY;* that is invaluable as much in cases of malnutrition as in promoting the growth of young animals.

GUARANTEED TO CONTAIN:

Pure Bone Flour	Salt	Potassium Iodide
Sulphur	Limonite	Charcoal
Potash	Sulphate of Iron	Meal
Bone Char	Calcium Phosphate	Molasses
Cobalt	Sulphate of Magnesia	

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Farm Practice and Management

Contributed by Officers of the Fields Division

Do YOU Waste Good Farmyard Manure?

THE accompanying photos were obtained on recent visits to farms. Unfortunately, the opportunities of obtaining similar snaps are far too frequent, and reflect a lack of appreciation of the value to pastures and crops of the fertilising ingredients contained in this manure.

In some respects farmyard manure is of greater value to crops and pastures than any of the artificial fertilisers in use today; but, because we get it for nothing and have to pay for the artificial article, we are inclined to place little value on it.

Farmyard manure is of considerable value, and if the trend of war tends to restrict our importations of other manures we may be compelled to use it more widely as a substitute for these fertilisers.

Dung, as depicted in Fig. 1, should not be dumped in heaps in the field.

This is wasteful, and causes rank growth which is quite unpalatable to stock. However, if this were evenly spread it would result in marked pasture improvement. How many of us realise that the droppings of one cattle beast in a year contain more fertilising ingredients than are applied in the average topdressing?

In Fig. 2 shed washings are shown. These have been discarded to dry out and will be lost as a source of fertiliser. Progressive farmers, however, would trap these in a concrete sump, cart them out in tanks, and apply them as liquid topdressing to fields in turn. More of this should be practised.

—C. WALKER, Instructor in Agriculture, Thames.

From Grass to Grass

Above.—Early ploughing with skim coulter attachment is necessary in the system described in this article.

Right.—The Cambridge roller. Consolidation is absolutely necessary for successful pasture establishment.

THE practice of resowing to grass after ploughing out of grass is not common, and the advantages of this system are explained in the following article.

In essentially grass farming districts, such as North Taranaki, a very common practice before resowing to pasture is to crop the land. Often, two crops are taken out, the first being a root crop, such as swedes, and the second an oat crop. Such a practice cannot be commended, for although a root crop may not have a detrimental effect, cropping with a cereal such as oats does leave the land impoverished for the following grass crop. The soils in the district mentioned and in many others in the North Island are of a light volcanic nature, and are easily depleted by crop growing under the usual high rainfall conditions.

Weed Problem

One of the greatest problems in high rainfall districts are weeds, and careful management of pastures is necessary to keep out these weeds and to maintain the sward in as nutritious and as highly a productive state as possible. However, even under reasonably good management many pastures tend to become weedy, and it is in the renewal of these pastures that we are concerned.

Such a renewal can be obtained by ploughing, suitable fallow, and the following out of a definite cultivation programme. Under the grass to grass system weedy pastures are turned under; subsequent cultivations have the aim of not bringing the grass sod to the surface, and these weeds stay buried.

Ploughing and Cultivation

Under the system mentioned ploughing should be undertaken early—that is, in November or early in December at the latest. With ploughing, the value of a skim coulter cannot be stressed too greatly, and in the renewal of pastures in this way it is practically essential. Otherwise, twitches such as *poa pratensis* and other weeds make rapid re-establishment between the furrow slices. The skim coulter takes off that corner of the furrow where weeds re-establish and drops this corner under as the furrow is turned over by the mouldboard.

A few weeks after ploughing the land should be rolled on the furrow with a Cambridge roller. This should be followed by a light double discing, care being taken not to pull up any of the furrow. The land should then be harrowed and the harrows and the roller left in the field. Following this, the area should be surface cultivated and rolled as frequently as weather conditions will permit; this latter action kills any surface weeds and leaves a loose surface for moisture conservation. Finally, the seed should be sown on a rolled surface and then covered with a brush harrow.

Time of Sowing

Apart from the fact that the seed bed for grass should be free from weeds and fine, firm and moist, the seed should be sown early enough to

High-producing pastures can be obtained by the method described in this article.

obtain good clover establishment. Sowings from the middle of February to the middle of March should be aimed at, for good clover establishment is best obtained in the first year by early sowing.

Seed Mixtures

Sufficient emphasis has been given to the importance of sowing the best strains of grass and clover seeds if first-class pastures are to be obtained, and every care should be exercised in the varieties and strains used. On most North Taranaki soils the following pasture mixture is recommended, but this may be varied according to soil type and general climatic conditions:—

	Per acre.
Certified perennial ryegrass ...	25 lb.
Certified white clover	2 lb.
Akaroa cocksfoot	10 lb.
Montgomery red clover	3 lb.
Italian ryegrass	5 lb.
Total	45 lb.

Conclusion

The establishment of pastures by the above system is well worth consideration, for by this method the field is out of production for only a short period, and if carried out in a proper manner first-class high-producing pastures can be obtained. Briefly, by adhering to the following rules successful establishment will be assured:—

The land must be ploughed sufficiently early and a skim coulter used on the plough.

Consolidation is most important, and should be aimed at all the time.

The seed should be sown early enough to ensure clover establishment.

Only the best varieties and strains of pasture seeds should be used.

Finally, as with the establishment of all crops, sowing should be accompanied by adequate phosphatic manuring.

—J. M. HOPKINS, Instructor in Agriculture, New Plymouth.

Handy Use For Glazed Pipes In Cowshed

IN most modern cowsheds rectangular concrete blocks are required for the separator, mount shafting and machinery, and for roof supports between each set of bails. In a shed recently visited cylindrical glazed pipes had been effectively used for all these purposes.

The separator was mounted on a 2ft. by 15in. diameter glazed drain pipe, which had previously been filled with concrete and reinforced (the lip of the pipe being uppermost), the engine shafting on 4 inch glazed pipes of similar type ,and the roof supports between the bails on plain unflanged glazed pipes.

The advantage of using glazed pipes can be appreciated, as they and the surroundings, are relatively easy to keep clean.

—D. M. E. MERRY, Instructor in Agriculture, Nelson.

MANUFACTURED BY CHALLENGE PHOSPHATE CO., LTD. AUCKLAND

Farmer Makes An Indestructible Floodgate

WHILE at a casual glance the accompanying illustration of a farm floodgate (Fig. 1) may appear to be of perfectly orthodox construction and similar to many another floodgate erected across a country stream or watercourse, the hazard of flood damage by heavy timber has in this case been practically eliminated. As will be noted, the cross rails are bored at both ends for attachment.

Fig. 2 shows a section of the gate viewed from upstream. The rails to the left of the central support are loosely wired to it (this attachment acts as a hinge), while those to the right are secured by pieces of soft wire bent in the form of split pins pushed through the same holes. The heads of these pins are showing.

Fig. 3, photographed on the downstream side, illustrates how the prongs of each pin are opened out to hold the rail firmly in position. When the stream floods the whole gate, supported by its strong overhead wire, lifts with the rising water level in the normal way, but should a log strike any of the rails, these pull off the opened end of their wire pins, swing into the direction of the current, and allow the obstruction to pass without damaging the floodgate.

Fig. 4 shows the appearance of one section had the four bottom rails been hit.

After the water has receded it is a relatively simple matter to lift the rails which have drawn from their pins, press the wire through the appropriate holes, and open the free ends so that the rails are again firm.

—D. M. E. MERRY, Instructor in Agriculture, Nelson.

Price of Strychnine for Rabbit Poisoning

Because of a substantial increase in the cost of strychnine recently purchased in London the Department has found it necessary to increase the price of strychnine sold to farmers for rabbit poisoning to 4/- per ounce, postage and carriage paid and 3/6 per ounce F.O.R./F.O.B. for bulk sales of not less than 100 ounces.

The Orchard and Vineyard

Contributed by the Horticulture Division

Orchard Notes

Harvesting and Marketing the Crop

EACH month of the year calls for some particular work to be done which, if neglected, may prove to be a factor in preventing the maximum returns being obtained. The principal work during the coming month is as follows:—

Continue with the cultivation.

Spraying stone fruits for brown-rot.

Spraying apples for *Glomerella*.

Harvesting and marketing early varieties of stone fruits.

Final overhaul of apple and pear trees, removing diseased and malformed fruits.

Final preparation of the packing shed.

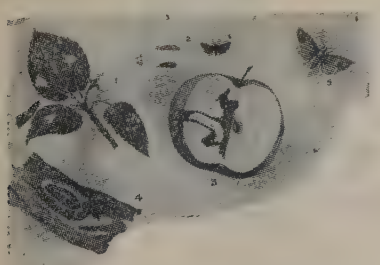
Cultivation

Continue with this part of the work until early in the New Year, when it should practically cease.

Spraying

Spraying should be continued, and if weather conditions are favourable for brown-rot development the stone fruit should receive special attention by spraying with lime-sulphur as mentioned in the October notes.

In localities where an attack of *Glomerella* is possible an application of 1-1½-100 Bordeaux should be given to apples; otherwise considerable infection may take place.



The Codlin Moth. (1) Codlin moth about to lay eggs on leaf and in calyx of apple; (2) life cycle—eggs, caterpillar or larvae, chrysalis, moth; (3) caterpillar in apple; (4) chrysalis and cocoon in bark; (5) codlin moth.

Leech or Pear Slug

Frequently, the attack of the leech on young trees that have not come into bearing has been disregarded by both domestic and commercial growers. This is a mistake, for if uncontrolled it multiplies to such a degree that defoliation of the tree takes place. It is important for growers to remember that if extensive defoliation takes place, both the buds and the vitality of the trees will suffer. This can be controlled with arsenate of lead as for codlin moth, but for stone fruit where damage may be caused the use of Hellebore powder is an effective remedy, using 1 ounce to 2 gallons of water. If made up a day or so before using it will be more effectual.

Harvesting and Marketing

The crop of fruit is now reaching the stage for marketing, stone fruits being the first. If it is worth while to exercise care and ingenuity to grow the fruit, it is equally important to take pains with the finished product. It is a pity to miss the best rewards of one's labour by carelessness or inattention at the harvesting period.

When to Pick

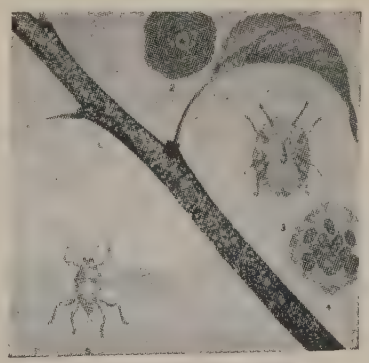
Just when and how the fruit should be picked to obtain the best market results depend very largely on the variety of fruit and also on the distance to which it is to be shipped. The closer the market the more mature the fruit should be when gathered from the trees. If, however, it has to be transported a considerable distance, allowance should be made for this, and it should be gathered before it reaches the full stage of maturity.

Handling the Fruit

Fruit should be handled almost as carefully as eggs; it should never be dropped carelessly into the boxes, as the slightest bruise may prove a starting point for ultimate decay.

For picking the fruit, one of the canvas picking bags constructed of heavy canvas with a steel frame at the top has proved very satisfactory. The large opening enables the fruit to be placed into it with ease, and both hands are free for picking.

The lower end of the bag, which is open, folds back to the steel frame at the top, thus forming the receptacle



The San Jose Scale (*Aspidiotus perniciosus*).—(1) Branch showing scale infestation; (2) female scale; (3) female before building dome; (4) female, under-side showing eggs; (5) male insect, mature.

for the fruit. This lower portion is fastened to the top when picking is in progress by a simple clip. To empty the bag, the base is simply released from the clip and the fruit is then gently deposited into the orchard boxes.

Fruit Wrapping

Is fruit wrapping worth while? Almost all experience indicates that it is quite worth while, especially with fruit of quality. Quite apart from an improved appearance, wrapping has other advantages:—

(1) The wrapper often events the spread of rot and disease from one fruit to another.

(2) It protects the fruit against bruising.

(3) It checks transpiration and prevents shrivelling to a limited extent, which is an advantage.

(4) Fruit can be packed more expeditiously when wrapped, as each fruit stays put.

Other incidentals necessary for packing to ensure safe and reliable transport are case-liners or wood-wool, without which considerable bruising may take place.

Grading and Sizing

Grading and sizing are very essential for good packing. In large packing sheds a sizing machine is a necessity. As the fruit passes over these machines it is sized in readiness for packing.

Here are a few points worth remembering:—

(1) Care should be taken to see that the field boxes have no inner surface projections of any kind; there should be no nails, protrusions of wood, or sharp knot holes, all of which are liable to cause injury to the fruit.

(2) In transporting the fruit from the orchard to the shed, care should be taken to place the boxes squarely on top of each other where more than one layer of cases is carried, and not to over-fill the boxes.

(3) Decaying and rotten fruit should not be allowed to remain about the packing shed; it should be destroyed.

(4) It is important that the grading machine should be free from all rough sharp edges or projections or surfaces which might injure the fruit.

(5) Dirty fruit should in no circumstances be packed.

(6) In packing great care should be taken to see that the fruit is to the correct height in the case in order that lidding can be carried out without damage to the fruit.

Labelling and Branding

It is preferable to label the cases before packing and allow them to dry before handling. With a wide brush apply flour paste or any other suitable paste which is sold for the purpose. Then apply the paste to the label and brush outward from the centre so that all creases may be removed. The application of the paste to a number of boxes at a time will give the paste a chance to soak in and fill up the pores of the wood before the label is applied. This will prevent the creasing and blistering of the paper.

(a) Don't walk or sit on packed cases.

(b) Don't handle packed cases of fruit roughly; place them, don't throw them or let them drop.

—L. PAYNTER, District Supervisor, Auckland.

SPRAYING MACHINERY for applying

ALL WASHES AND DUSTS, LIMEWASH, CREOSOTE AND DISINFECTANTS

THERE IS THE RIGHT MACHINE FOR EVERY JOB — ASK A FRIEND WHO IS USING A "VERMOREL" SPRAYER.

No. 14—The "Noe-Leo" Pneumatic Knapsack Sprayer

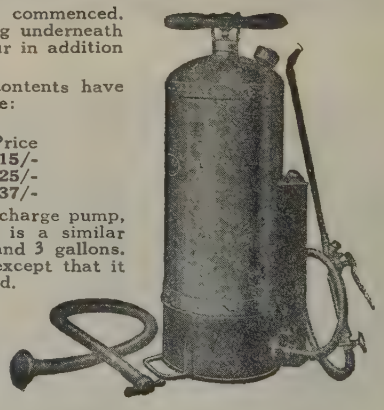
Pressure (up to 175 lbs. per square inch) is established before spraying work is commenced. Both hands are, therefore, free to direct the lance or hold aside foliage for spraying underneath the leaves. It is made of a Special Brass Alloy and may be used with Lime Sulphur in addition to the usual washes, and is fitted with Instantaneous Spray Control Lance.

The "Noe-Leo" is filled by suction and the air pressure is retained when liquid contents have been sprayed. **This saves time and labour when recharging.** Three models are made:

No.	Total Capacity	Liquid and Working Cap.	Pressure Lbs. per sq. in.	Price
7	4 gals.	2½ gals.	Up to 110	115/-
8	5 gals.	3½ gals.	„ „ 110	125/-
9	5 gals.	3¾ gals.	„ „ 175	137/-

The "FAVORI" is a sprayer of the same type, but is filled by means of a separate charge pump, which supplies up to 12 Knapsack Sprayers. Price complete, 94/-. The "SEM" is a similar machine made in two sizes, total capacities 1½ and 5 gallons, working capacities 1 and 3 gallons. Prices 76/- and 94/-. This machine has the same advantages as the "Noe-Leo," except that it is filled by pouring the liquid into the container and the Air Pressure is not retained.

A Wheeled Pneumatic Sprayer with liquid capacity of 11 gallons working at a pressure of 220 lbs. per square inch is also made. Prices from £11/12/6.



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All Types of Wet and Dry Sprayers Made and Stocked.

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Citrus Notes

Physiological Diseases and Harvesting

IN last month's citrus notes reference was made to fungous diseases, insect pests, and bacterial diseases which could not be controlled by normal spraying practices. The physiological diseases in the same category are:—Frost-injury, hail-injury, sun-scald, gum-spot, oil-spot, mottle-leaf, and spray-burn.

Frost-injury.—Frost-injury results annually in many orchards, and is noticed by the shedding of young fruits and the appearance of gum-spot on the foliage. In more severe instances the foliage wilts, turns brown, and drops; twigs also wilt and later turn black. Externally, fruits may appear perfect, but are found to be dry when cut. In severe cases fruits turn light brown and then black. The remedy consists in cutting gaps in the shelter belts at the lowest point in order to remove all tendencies to frost pockets and, if warranted, installing fire pots. Lemon trees appear to be most susceptible to frost, and New Zealand grapefruit least.

Hail-injury.—Hail-injury occurring as a result of hailstorms is apparent by defoliation or the leaves being lacerated. Slight hail-injury on the fruit results in oil-spot; more severe hail results in brown pits with cracks radiating from the central point.

Sun-scald.—Sun-scald appears as reddish-brown, scabbed areas on the under-surface of the leaves or darker brown on New Zealand grapefruit twigs. Sun-scald is due to sunburn, and is most frequently seen on the New Zealand and American grapefruit, mandarin, and sweet orange.

Gum-spot.—Gum-spot appears as small, raised pustules on the leaves, dark brown to purplish brown in colour. smooth and hard. A similar appearance is sometimes noticed on stems and fruits. Gum-spot is due to frost followed by bright sunshine, sunburn, spray-injury, and lack or excess of certain chemical elements. As a spray-injury it is generally due to the incorrect mixing or application of sprays, and has been noticed when Bordeaux has been prepared by mixing bluestone and lime when the latter has not been thoroughly dissolved.

Oil-spot.—Oil-spot or *Oleocellosis* results from the liberation of the natural oil on to the surface of the fruit. It appears as a green or brown oil spot, the affected area being slightly sunk. It occurs chiefly on lemons in spring and autumn, and can be avoided by not picking green lemons when wet or allowing such fruit to be bumped, thus causing surface abrasions.

Mottle-leaf.—Mottle-leaf appears on the foliage as a mottled appearance due to a lack of chlorophyll between the main veins of the leaf. Its cause appears to be due to soil deficiencies of certain plant elements, and, to avoid mottle-leaf, humus should be maintained and organic manures applied, as mottle-leaf and other chlorotic symptoms are generally due to the lack of minor elements.

Harvesting

By the time these notes appear growers will be entering the 1941 season, and there are one or two aspects of the harvesting of lemons which require consideration. These are size and maturity at which to pick.

All growers realise that there are counts which are preferred by the retailer in all classes of fruit. The preferred counts for lemons are those which approximate to the 216 to the cured packed bushel or the 158-175 to the three-quarter bushel case at present in use. This count is fruit of 2 3-16in. in diameter, and therefore selection should be made when picking of fruit 2¼in. in diameter, allowing for shrinkage. All fruit of this size which has the required juice content and is light green or silver should be harvested. All fruit beyond silver should always be harvested, and all dark green, immature fruit left on the tree.

If growers maintain monthly pickings to size there will be little overmature fruit. All growers realise that a lemon may become fully coloured and yet hang on the tree a long time. When harvested, such fruits are nearly tree-ripe, and decline rapidly in store and in transit. Even peel fruit, although it requires to be fully coloured, should not be tree-ripe, the ideal fruit being coloured but firm.

Wholehearted grower co-operation is essential in the harvesting of lemons, so pick regularly, pick to size, pick to correct maturity, and handle with care.

—A. M. W. GREIG, Citriculturist, Auckland.

Viticulture

Points in Making Cider

WITH the increasing production of apples in the Dominion and the high standard required in grading both for export and the home market, it is becoming more and more necessary to make profitable use of both the surplus apples in years of super-abundance and of those apples which, although otherwise good and sound, are debarred from the higher grades by slight blemishes.

Because of the facility with which large quantities of fruit can be converted into a most palatable and wholesome beverage, which will keep for years when well prepared, and of which the over-production in years of plenty can be utilised to level up the stocks in years when the crops are below the average, the manufacture of cider may be looked upon as a most important safety-valve for the New Zealand apple industry.

Much of the cider manufactured in this country has formerly been prepared by "rule of thumb" or more or less haphazard methods, which, if carried out on a commercial scale, would soon lead to disaster. This article has been prepared with a view to assisting orchardists and others who wish to undertake the manufacture of cider by aiding them to produce by scientific methods a first-class uniform article, clear and bright, with good flavour and keeping qualities, which should meet with a ready sale.

Comparatively few people in this country realise what a delicious beverage a well-prepared, light cider is, for the experience of cider is more generally confined to one of the numerous

heavy concoctions sold under that or similar names, made with artificial flavouring and colouring materials and artificially carbonated to produce effervescence.

Varieties of Cider

There are several varieties of cider, both draught and bottled, which differ in their methods of preparation. These are known as dry cider (still or sparkling) in which most of the sugar has been transformed by fermentation into alcohol and carbon dioxide; sweet sparkling cider, in which sufficient sugar remains untransformed; and champagne cider, prepared by the same methods as champagne wine is in France. The manufacture of these different varieties will be explained later.

The Regulations governing the manufacture of cider in this Dominion are as follows:—

Cider, General Standard.

82 (1) Cider shall be the product of the alcoholic fermentation of the expressed juice of sound apples, with or without the addition of sugar prior to, during, or after fermentation. It shall contain not more than fifteen parts per centum of proof spirit. To cider carbon dioxide may be added without declaration.

Labelling.

(2) In the label attached to every package containing cider there shall be written the word "Dry" or the word "Sweet", as the case may be, to which may be added (where such is the case) the word "Sparkling". The word "Champagne" shall not appear in the label attached to any package containing cider unless the contents of such package have been prepared by the champagne process.

Apple Wine.

82a. Any product of the alcoholic fermentation of the expressed juice of apples shall, when such product contains more than fifteen parts per centum of proof spirit, be labelled "Apple Wine." The word "Sherry," "Madeira," or any wine name other than "Apple" shall not appear in the label of apple wine.

Choice of Apples

The value of New Zealand-grown apples from a cider-making point of view has not been systematically tested, but excellent cider has been produced from Lord Wolseley's Cox's Orange, Delicious, Sturmer, and Worcester Pearmain apples fermented alone or blended with other varieties. There is a large field for local experiment in selecting the most suitable varieties and blends of varieties for making cider and the placing of the acquired results before cider-makers so that they may have a basis on which to manufacture with a prospect of making a payable article from the beginning without having to take the risk of experimenting in the early stages.

Apples grown specially for cider will improve if left on the trees as long as possible. It is during the latter part of their vegetative life that their agreeable flavours develop. It is generally conceded that the varieties which mature during the latter part of the season and whose juice is fermented during the winter months furnish the highest-grade ciders.

The apples should be ripe, perfectly clean, sound, and free from mould and earthy flavours acquired through lying too long on the ground. The inclusion of a small proportion of overripe apples which are turning brown will not be detrimental to the quality of the cider—in fact, juices in which they are incorporated have a tendency to clear more rapidly than those from which they are omitted. Too large a proportion, however, affects the flavour and makes the cider dark in colour, which is generally considered undesirable.

Maturing and Blending

To obtain the best results in the palatableness and keeping qualities of the resulting cider the apples should be milled when the maximum of aroma, flavour, and sugar content is reached —when, in fact, they are at their best for eating purposes.

The skin of the ripe apple should have a dry and slightly wilted appearance. When the ripe apple is pressed with the thumb it should yield with a slight crackle, but not feel mushy. The ripening process, which includes the transformation of starchy and other matters into sugar, should be followed closely, as there is a considerable difference in the sugar-content of partly ripe apples and that of apples which have reached their maximum of ripeness.

The density of the juice, which does not quite correspond with the absolute sugar content, although near enough for practical purposes, should be tested with a hydrometer from time to time until no further increase is noticeable, when, other conditions being favourable, the fruit will be ready for grinding. This should not be delayed too long, or the apples will become mushy and the process of extracting the juice more difficult, with consequent lowering of the yield of juice.

Freshly gathered apples are rarely sufficiently ripe or mellow to be converted into cider at once; even the early varieties can be improved by leaving them on the ground in favourable weather. This, however, should be avoided wherever it is possible to store them under cover, as in rainy seasons the apples may lose some of their saccharine contents and may also acquire an earthy flavour, besides being rotted by excessive humidity.

Under cover they should be separated from the soil to prevent their being contaminated and to allow the air to circulate freely both underneath and through them. This can be done in several ways—for instance, by covering the soil with loose boards raised on fairly high cross-pieces, or by covering the floor with a layer of manuka. The apples can be placed in heaps not deeper than 3 feet, with air-shafts formed of small bundles of manuka placed at intervals to facilitate free ventilation. Apples placed in large piles are liable to heat and ferment. Where bushel cases are available the fruit can be stored in these and placed under cover, with the cases piled up as they are in cool storage; in fact, this will probably be found to be the most convenient and economical method of keeping them.

The French cider-makers generally mature their apples in a loft above the cidery and feed them down to the mill by gravitation. Whichever plan is adopted, it will be found advantageous to store each variety and the varieties of each of the ripening-periods separately in order to facilitate the handling of them when required for the mill.

French Method

In the older cider-making countries, among which France leads with an annual average production of more than 600,000,000 gallons, special cider apples suited to the climatic and soil conditions are grown. Some of these varieties make good cider by themselves, but the general rule is to blend the different varieties in order to combine the necessary proportions of acid, sugar, and tannin to produce a good-keeping and palatable drink. Experience has proved that a better fermentation and resulting cider are obtained in this way than by blending the cider produced from different varieties of

apples fermented by themselves, although this course is necessarily followed in blending the ciders made during different ripening-periods or in different years.

The question naturally arises here as to what proportions of sugar, acid, and tannin the juice of an apple should contain to produce a good cider. There is no exact formula, but it is known that finished ciders lacking in alcohol, acidity or tannin are generally of poor quality and flavour, and are subject to deterioration. The composition and amelioration of the finished cider will be considered later.

—B. W. LINDEMAN, Vine and Wine Instructor, Auckland.

(To be continued.)

Cool Storage Notes

Overhaul of Plant and Equipment

THE season's operations are drawing to a close with the diminishing of cool storage stocks of apples and pears, and preparations for dealing with the new season's crop are now under way.

When the refrigerating plant has been closed down for the season a thorough overhaul of all the plant and equipment should be undertaken. The ammonia pipes should all be thoroughly scraped, cleaned, and painted. The atmospheric condenser should receive special attention in order to remove all rust from the pipes. A scraping tool can be made from an old file by heating one end and tapering to a sharp edge, and then turning the edge to the shape of a piece of pipe the same size as the coil. A disused bicycle chain is also effective in removing old paint and scale from pipes.

Before starting up for the next season's run the refrigerating engineer should give the ammonia compressor an overhaul, as the valves may require attention. Oil strainers and scale traps should be removed and thoroughly cleaned. The condensor pump should be thoroughly overhauled, as this is a most important part of the equipment.

During the shut-down period cool chamber doors should be left open to keep the chambers fresh until they are required for the new season's fruit.

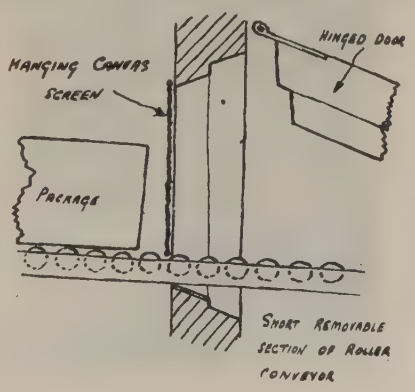
Many different types of belt drives are in use for transmitting power to refrigerating machines. One of the most popular of the modern drives is the V belt. This is often run from a grooved motor pulley on to a plain flat-faced compressor pulley.

Ports are largely used in cool stores for loading fruit in and out of the chambers on gravity conveyors. The accompanying sketch illustrates a convenient arrangement for a port with a hanging canvas screen to prevent leakage of air from the chamber, and also a short length of roller conveyor which may be easily withdrawn before closing the port.

The past season's daily log sheets or records kept of the details of the running of the refrigerating plant and cool storage temperatures, together with notes and particulars of fruit held during the season, should all be filed and kept for reference.

During the coming season it will be essential to obtain the maximum use of all cool storage space. When the early varieties of apples and pears are being harvested storage space will be required in order to regulate market supplies. The best use can be made of cool storage space if the kinds and varieties of fruit which require to be held at the same cool storage temperatures are held in the same chambers. For instance, all pears require to be held at 30deg. to 32deg. F.; therefore suitably refrigerated chambers may be set aside for holding this fruit.

The different varieties of apples should be held in cool storage at temperatures found to be most suitable for each variety. Cox's Orange, Jonathan, and Sturmer are held at the same temperatures (37deg. to 38deg. F.), and therefore these varieties should be stored in the same chambers. This also applies to Gravenstein, Delicious, Granny Smith, and Tasma, as these varieties are held at 32deg. F.



During the latter part of the season deterioration has been noticeable in cool storage stocks by rots that have developed from stem punctures in unwrapped fruit. The wrapping of alternate layers is therefore advisable to minimise losses in long storage fruit which has to be transported before storage.

Although all round plain pads do not offer the same protection against bruising as the corrugated pads, losses from injury have been minimised in cool storage fruit in the plain pads when the fruit was carefully sized and packed and alternate layers were wrapped and the fruit placed in cool storage at the correct state of maturity.

Tests carried out during the past two seasons have indicated that better results can be obtained with Granny Smith apples in cool storage when they are held at a flesh temperature of 32deg. F. These tests have also shown that external discoloration and the development of lenticel rots, such as *Neofabraea malicorticis*, may be controlled by the use of oil wraps. A delay of 10 to 15 days after picking and before cool storage is also beneficial, but the fruit should be still green in colour when placed in cool storage. Granny Smith apples should be placed in cool storage not later than April 25 for long storage.

It would be beneficial if long storage varieties of apples and pears were stacked in cool storage chambers to growers' registered numbers, as fruit held for long storage should be accessible for regular inspection. This method of stacking fruit would facilitate inspection, and thereby minimise losses and reduce handling charges.

—A. POWELL, Cool Storage Officer, Wellington.

The Home Garden

Vegetables, Small Fruits and Flowers

Treatment of Small Fruit Plantations

As the picking season passes, the small fruit plantations require attention. A small amount of pruning is required, after which the ground should be lightly cultivated and a cover crop sown. So that this cover crop will make the maximum growth, a light dressing of superphosphate (about 1 cwt. per acre) should be applied at the time of sowing. This cover crop should be planted in all the plantations mentioned below, with the exception of strawberries. Farm manure, if available, may be applied in place of or in addition to the cover crop.

STRAWBERRIES.

In districts where an autumn crop is expected, and in those where the beds remain down for two or three years, all runners should be suppressed from fruiting beds. Where new plants are required, runners should be allowed to develop on plants that are not allowed to bear fruit. These produce more vigorous plants.

GOOSEBERRIES.

Little, if anything, is to be gained by summer pruning this crop, unless it be to remove branches damaged as a result of picking and the young sappy growth from the centre of the bush. These, when 6 to 8 in. long, should be pulled out in preference to cutting.

CURRANTS.

From black currants the wood which has borne fruit should be cut back to strong young side branches or removed entirely, leaving only the young wood, which will bear next season's crop of fruit. It is advisable, when at all possible, to cut the old wood right back to the ground, leaving only the young growths from the crown.

The red currant bears fruit on short spurs. Unless the bushes are very dense it is not advisable to attempt pruning until the leaves have fallen in the late autumn.

RASPBERRIES.

Canes which have borne fruit, and the weaker of the new canes, should be removed as soon as possible after picking to encourage the development of the new growth.

LOGANBERRIES.

After the fruit has been gathered the old vines should be cut out. The new ones should be reduced to four or six of the strongest and placed on to their wires, two or three being trained each way.

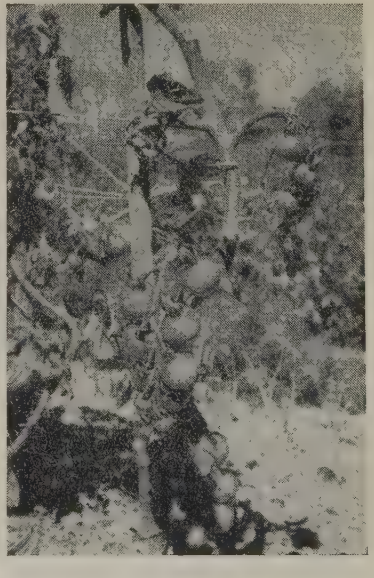
Seasonal Don'ts

Don't

defoliate tomato plants unnecessarily. The accompanying illustrations show a plant so defoliated that it produced very poor fruit. The plant shown in the second photograph was grown by a commercial grower and produced an abundant crop of excellent fruit. This plant was grown up on four stems, and the density of the foliage was no disadvantage. A slight defoliation, such as the complete removal of the lowest leaves as they begin to yellow, to increase the passage of air through the plant, is permissible.

Don't

allow tomato laterals to grow; they rob the developing fruits of necessary sap. Laterals should only be allowed to develop late in the ripening of tomatoes in the glasshouse, where every inch of leaf surface is required to mature the fruit. This applies especially where tomato leaf-mould is present in the glasshouse.



What To Do In The Garden Next Month

Summary of Operations during January

VEGETABLE SECTION.

SUCCESSIONAL SOWINGS.

Dwarf beans, lettuce (grow without transplanting), peas (early dwarfs after the middle of the month), radish and spring onions (water well), turnips.

Other Sowings.—Endive.

SEEDLINGS TO TRANSPLANT.

Borecole, broccoli, Brussels sprouts, cabbage (savoy, winter and red), cauliflower, celery, leek.

SPECIAL NOTES FOR COLD DISTRICTS.

Sow spring cabbage towards the end of the month (in other districts during February).

CROPS IN SEASON.

(The month in brackets represents the month of sowing the seed.)

Salads.—Lettuce (Oct.), radish (Dec.), corn (Oct.), outdoor tomatoes and cucumbers (Sept.).

Greens.—Beans (Sept., Oct.), marrows (Aug., sowing in warm districts), peas (Sept., Onward and Alderman), New Zealand spinach (Oct.).

Roots.—Beetroot (Sept. main crop and last of the Sept. earlies), carrots (Sept. shorthorn and main crop), parsnips (Aug.-sown Oxheart), potatoes (main crop), onions (Mar. and July-Aug.), shallots (Aug.), potato onions (May), pumpkin (Red Warren in warm districts), turnips (Nov.).

CROPS IN STORE.

Kumara (if well stored).

GENERAL WORK.

Spray on fine mornings for potato and tomato blights. Use derris dust to control white butterfly larvae.

Water well when necessary, and maintain a surface mulch to conserve moisture and to control weeds. Make the cultivation shallow where crops are approaching maturity.

Dig under any harvested crops, such as peas and beans, but burn potato haulms, cabbage and couliflower stumps promptly.

Tie up and prune outdoor tomatoes.

Sow a cover crop on any ground that is not being used for cropping.

Harvest onions as they mature.

Lift vines on kumara patch to prevent them from rooting at the nodes.

Continue to earth up potatoes and other crops.

FLOWER SECTION.

Take tip cuttings of hydrangeas and various shrubs as they reach maturity. Set them in sand or sandy loam to strike.

In districts where the winters are warm and free of frost anemones and ranunculus may be planted this month. If they are watered during the dry seasons anemones should begin to bloom in May and ranunculus in July.

Sow seed of hardy annuals and biennials in boxes or beds for transplanting in the autumn. The soil should be protected from the direct rays of the sun until the seedlings appear.

Remove spent blooms promptly, and from plants that continue in bloom for a long season cut back to strong buds, which should produce strong growth for later blooming.

GLASSHOUSE SECTION.

As harvesting is completed the tomato vines should be removed from the house and burnt. Pull the tomato vines up from the ground and leave them hanging for several days to dry out before burning them.

Thereafter on a calm night seal the house and burn sulphur in it (2lb. per 1,000 cubic feet).

This done, the house should be thoroughly cleaned and any repairs effected and painting done.

The ground should be cultivated and a cover crop sown.

Watering During Drought

THERE is a great temptation to apply water at frequent intervals to both vegetables and flowers during spells of dry weather. It is common for water to be applied too frequently and in too small quantities to be of much use. Frequent light waterings maintain the surface of the soil in moist condition, but where insufficient water is applied to penetrate deeply into the soil a great amount of harm may be done. The roots of plants are attracted to the moistened top layers where, if the watering is discontinued for even a short period, they will suffer if these layers dry out.

When watering is required sufficient should be applied so that it can penetrate to the subsoil. Then, if the surface of the soil is loosened, as soon as it is dry enough to handle, the dry soil mulch that will be produced protects the store of water in the soil from the drying influences of the sun and wind. The plants are then encouraged to send their roots deep into the soil in search of both food and moisture. In such a position they are relatively immune to the effects of drought, and an occasional watering to moisten the ground thoroughly keeps them thriving.

On soils which drain very readily it will be necessary to water more frequently than on soils which are more retentive of moisture. The sooner over-drained soils can be adequately supplied with humus the better, as humus, acting as a sponge, holds water and makes it available to plants. The humus-content may be increased in a number of ways. Compost, farm manure, or a green manuring crop may be dug into the soil. The soil may be mulched with similar material, which, in addition to shielding the soil from the intensity of the sun, supplies valuable humus.

—F. SYDENHAM, Assistant Horticulturist, Wellington.

Cider-making

There has been an increasing demand for advice and information on cider-making from persons desirous of producing this beverage on a commercial scale, states the annual report of the Director of the Horticulture Division. The output of cider for the season is estimated at some 60,000 gallons.

APIARY NOTES

Contributed by Officers of the Horticulture Division

Care in Honey Packing

CONSIDERABLE quantities of honey will be lost where bee-keepers fail to add supers to the hives as required after the main honey flow begins some time in December in most localities throughout New Zealand. It is not good practice, however, to add more than one empty super at a time unless the hives are very strong in bees and all storage room is taken up, and then only when the weather has become settled and prospects are good for a continuation of the main honey flow. If more than one super is added at a time and a period of cold, stormy weather follows the work of brood-rearing receives a serious setback, from which the bees may not recover sufficiently to do good work that season.

Where queen excluders are not used the bee-keeper should keep the brood down in the bottom boxes, making certain that the bottom box contains at least eight combs of brood and pollen before brood is allowed to remain in the super above. The queen quite naturally moves up into the second box, and even higher, until there is a stronger flow of honey, when she is gradually forced down by the storage of honey in all empty spaces above the main brood nest.

It is a good plan when making room for the queen in the second box to place all combs containing honey in the centre of the third box directly above the brood and fill in the outside spaces with empty combs. This arrangement of the combs containing honey acts as a block to the queen, and will usually exclude her from the supers above. Apiary work should be arranged so that it is not necessary to disturb the bees and brood when the main honey flow is full on.

Swarming need not be feared from this time onward where young queens are in the hives and laying well, provided the bees have sufficient room and good ventilation. The next step to secure the maximum crop is to remove all storage combs as soon as they are fully capped over by the bees and replace immediately with empty combs so long as the main honey flow lasts.

Honey Flavours

Honey flavours are quite unlike that of any other food. The nectar obtained by the bees from each flower carries with it individuality in the form of colour, flavour, and aroma, and great care must be taken not to impair these qualities. It is necessary for bee-keepers to exercise great care when handling a crop of honey, as it may be spoiled in many ways, such as by the use of unclean utensils, the excessive use of strong-smelling fumigants to protect bee combs in storage against wax moth, especially if the combs are damp or during humid weather conditions, and also by burning materials in the smoker that give off a strong odour, or excessive smoking of the bees and combs while the crop is being removed.

Although honey packing in New Zealand is usually carried out reasonably well, there is still room for improvement to ensure that all honey of good quality is offered for sale in good condition. It is sometimes noticed that honey apparently in good condition at the time of grading tends to sour and ferment after a few months storage, especially in warm weather. There is no doubt that such honey has been contaminated in some way during extracting and packing operations, or has been gathered by the bees under unfavourable conditions and/or later stored by the bee-keeper under unfavourable conditions.

Clean Utensils

Examinations made by Lockhead (Division of Bacteriology, Ottawa) of the interior of tanks and pipe lines clearly showed that they may represent more or less serious sources of infection. Further investigations showed that honey-fermenting yeasts are present in the field flowers, apiary soil, and to a certain degree the honey in the hives. It therefore becomes important to keep all utensils as clean and sterile as possible; especially should the wash bucket be emptied and washed clean of every trace of honey each day. Also, the floor mops should be attended to, otherwise they soon sour and become a source of active infection.

Fermentation

Yeast bodies which cause fermentation float in the air; therefore, they are actually present in a viable or living condition in unheated honey. Scientific investigators have shown that these yeasts are unable to grow and multiply in well-ripened liquid honey because of the heavy concentration of sugars which prevent their growth, but when the honey granulates there is a partial separation of the sugars and water, which gives a reduced sugar concentration in certain portions of the honey, in which the yeasts may grow in temperatures above 55deg. F.

Honey may be spoiled by added moisture absorbed while the honey is exposed to a damp atmosphere or accidentally introduced by the bee-keeper during extracting operations. This condition is revealed by the thin light body in either the liquid or granulated form.

Honey will ferment more readily in a soft or semi-granulated state if such condition is a permanent feature. This condition can be brought about either by added moisture, excessive air bubbles, or by stirring when the honey has already begun to granulate.

No honey should be removed to the honey house at the height of the honey flow before it is capped over by the bees, and at other times unless it is fully two-thirds capped over. If this rule is not adhered to there is a danger of taking honey from the hives from which the normal amount of

(*Continued on page 464.*)

Notes for the Poultry Farmer

Contributed by Officers of the Livestock Division

Care of Young Stock

SOME weeks have passed since the process of incubation concluded, and all young stock should now be past the brooder stages. With this important work completed, the poultry-keeper is afforded an opportunity to concentrate on the development and welfare of his young stock. Many people consider that chickens are safe once they have passed the brooder stage, but actually they are only starting on their hazardous journey in life. From now on to a great extent they require to use their own intelligence and activity in guarding against the many pitfalls that beset their path between this stage and pullethood.

It should be the aim of every poultrykeeper to keep the young stock growing, and every effort should be made to prevent any check in their development. This can be achieved only by the adoption of good management, which entails constant attention to the many details together with regular feeding of good wholesome meals and grains which supply the necessary elements for bone and body development.

With the approach of hot weather it is imperative that the birds be provided with some sort of shade, and a regular supply of cool fresh water should be available to them at all times. Green food plays an important part in the health of all classes of stock, and therefore an abundance of chaffed-up greens, such as silver-beet, young green oats, lucerne and watercress, should be fed daily. Oyster-shell and metal grit should always be available to the birds. The former is the medium of supplying lime (calcium) to the birds, and the latter assists digestion.

Shifting the Stock

It will thus be seen how essential these materials are for both growing stock and laying birds. Early hatched pullets will be coming into production from now onwards, and it is most essential that young pullets should be placed in their permanent quarters and allowed to settle down and become acquainted with the new surroundings some weeks before beginning to lay. This work is necessary, for should the pullets be laying before being put in these quarters, the shift will probably cause a moult and a severe drop in egg production.

To achieve good results it is essential to have good, roomy, well-ventilated sheds free from draughts and a good depth of litter on the floors, which should be dry and sanitary. Plenty of nests and perches should also be provided.

It is a good practice when transferring pullets to the permanent laying quarters to cull out all birds which show any sign of not becoming profitable producers. Unthrifty specimens which do not possess constitutional vigour should be rejected, as also should those which do not conform to breed type. Experience has shown that when young stock have been subjected to improper management there is a tendency for the development of the birds to be retarded, with the resultant loss of vitality which is responsible for lowered resistance to infection. Naturally, such conditions do not favour high egg production. The following are some of the chief causes responsible for such conditions:—Overcrowding, stale ground, insanitary quarters, and the feeding of inferior foodstuffs.

Care of Laying Hens

The aim of all poultry-keepers should be to keep the hens laying until the pullets come into production, which, if hatched at the right seasons of the year, should be March or April. It is desirable to keep a constant watch on the egg yield. At this season the presence of vermin such as red-mite, body lice and depluming mite, or the birds not getting sufficient food, is often responsible for a large number going into a moult, with the result that egg production suffers. Every care should be taken to keep the birds free from parasitic infestation, as these pests not only irritate but also have a tendency to lower the birds' vitality.

Very often, by allowing a little extra feed together with a little extra protein, such as skim-milk, meat-meal, cooked meats, etc., from now on will have the desired effect of keeping the hens laying well into the autumn. If the hens have been laying well for many months every care should be taken to ensure that they are given as much mash and grain as they can consume at each meal without waste. A regular supply of green food, oyster-shell and metal grit should be fed daily, and a supply of fresh, cool, clean water should be available to the birds at all times.

Culling

The main work of culling should not take place until March, but it must not be inferred that the weeding out of undesirable stock should be left entirely to that time, as odd birds may to the advantage of the plant be culled out at all periods of the year. On most poultry plants some culling may be done to advantage during December and January. All overfat hens and those that show evidence of a weak constitution should be disposed of at once.

Now that the breeding season is over the male birds should be separated from the females. Only males which have come through the season sound and constitutionally fit should be retained for further stud purposes. The remainder should be disposed of as early as possible.

There should be no hesitation in culling out surplus cockerels that have reached the age of four and a half months. Once cockerels pass this age they lose a degree of value from a table view point, and besides being a nuisance on the farm, the quarters occupied by them are of more benefit to the future profit-making pullets.

Poultry-keepers who feel that their experience is insufficient to enable them to undertake the culling and selection of their birds may on application to this Department secure the services of a Poultry Instructor to assist in this work.

N.Z. Federation of Young Farmers' Clubs

Edited by S. Freeman, Dominion Organizing Secretary

Dovedale Y.F.C. Annual Field Day

By D. MERRY, District Secretary, Nelson.

THE Dovedale Y.F.C. have a worthy reputation for the success of any club undertaking, and this year, as in the past, the annual field day held on Mr. N. A. Win's property was a further laurel to club successes. The afternoon was well attended by farmers from the surrounding district and club members.

The opening proceedings began at about 1.30 p.m., when, under the title of "Sheep Skinning Demonstration," Messrs. I. S. Win and W. G. Kenyon showed the audience just how quickly a sheep's skin could be parted from its body. Mr. R. W. Skinner, Inspector of Stock, Nelson, then dealt with the remains in his post-mortem examination. Mr. Skinner described the functioning of the internal organs and the pathological symptoms associated with common infections.

The Instructor in Agriculture, Mr. D. Merry, followed with a talk on how the more common pasture plants could be readily identified and their suitability when compounded into pasture seeds mixtures. An inspection was then made of a Departmental manurial trial, and the efficiency of the basic slag applications for that type of country was noted. At this juncture the ladies served afternoon tea.

A demonstration of the possibilities of the electric fence for retaining pigs was then staged by a local firm. Several visitors who received the "kick" from a charged fence wire were much impressed with the apparatus.

Following this, a move was made to the model cowshed belonging to Mr. Win, where Mr. C. W. Smith, Farm Dairy Instructor, spoke on the management of a farm dairy, stressing the necessity of scrupulous cleanliness and efficient drainage. A description of the working of the modern milking machine was provided by a representative of a local agency.

Jersey cows were the subject of a stock judging competition, and the result was:—Junior Young Farmers: H. A. Win, 1; C. Davies, 2. Senior Young Farmers: I. S. Win, 1; W. G. Kenyon, 2. Farmers' Union: Mr. S. Win, 1; Mr. J. F. Black, 2.

At the conclusion of the afternoon, Mr. W. G. Kenyon, club chairman, thanked the lecturers and demonstrators for all that had been done by them, and also thanked those present for coming along. Mr. S. Win, president of the Dovedale Farmers' Union, suitably replied.

A collection was taken during the afternoon and donated to patriotic funds.

Western Bay of Plenty Ensilage Competition

By A. V. ALLO, District Secretary, Western Bay of Plenty.

DURING the past winter a Y.F.C. ensilage competition was held for clubs in the Western Bay of Plenty.

Mr. F. W. Doidge, M.P., presented a handsome cup for competition, and there were 28 entries. The writer acted as judge, and results were as follows:—

H. Allan, Omokoroa Y.F.C., 84 points	1
P. Voltz, Paengaroa Y.F.C., 83 points	2
J. Plummer, Omokoroa Y.F.C., 82½ points	3

In general, the standard of the entries was very good, and revealed that entrants had a good knowledge of silage-making. A common fault was that the material was cut too late, thus being too stalky. There was also too much waste with many of the entries, mainly because the earth covering had not been carried out right to the edges of the pit or stack. A little more care in building could also have meant less waste. Many entries were too dark and sweet because of excess fermentation at too high a temperature.

The winner had a useful suggestion to offer: he always puts one or two sweep loads of hay at the bottom of the pit before adding the green material. He claims that the hay will absorb any moisture draining out of the silage and thus help to avoid loss of valuable food materials.

It is hoped to continue the competition next year.

Mid-Canterbury District Field Day

By R. INCH, District Secretary, Ashburton.

ABOUT 70 members of the Mid-Canterbury clubs took advantage of the generous invitation of Mr. J. H. Grigg to visit his property at "Longbeach" for the Annual Y.F.C. District Field Day, and to inspect his pastures and stock.

The party's first visit was to the dairy, where the milking machines were inspected. Mr. Grigg explained that, in his opinion, the particular type of machine gave the nearest approach to hand milking. A fine Holstein bull in the yard created great interest, Longbeach Holsteins being famous throughout the Dominion. The original members of the stud were imported from Holland 56 years ago, and the present members of the herd have no other blood in them, having been line-bred from the original stock. The short-legged cows, showing every evidence of high production, were also very much admired .and made a very favourable impression on the visitors. Mr. Grigg's talk on breeding was followed with great interest, and many points were discussed.

In the woolshed both stud and flock Corriedale and Southdown sheep were exhibited, and here again Mr. Grigg gave a demonstration of the various points. The Corriedales, in particular, were a source of admiration, being, to quote a well-known authority, the "low-legged type, with good bodies, straight top-line, square front and back, and open faces."

During the luncheon interval the party wandered through the grounds, where large old trees and flowering shrubs have formed a living memorial to the pioneer, John Grigg, who, taking up the land in 1864, made a beautiful home out of what was originally classed as an impenetrable swamp.

After lunch, pastures on different parts of the farm were inspected with interest. Black barley is largely used for autumn and winter green-feed, and a greater use of this was advocated. Fields of subterranean clover, which Mr. Grigg favours for spring and early summer feed, and ryegrass pastures, many of them 10 and others up to 30 years old, were a practical demonstration of good management.

Mr. J. Fleming, Chairman of the Mid-Canterbury Y.F.C. Executive Committee, expressed the party's appreciation to Mr. Grigg, and an enjoyable and instructive day was brought to a close.

Wairarapa District Essay Competition

By N. LAMONT, District Secretary, Masterton.

ENTRIES in this year's essay competition were maintained at last year's figure, and some very interesting entries were received. The subject, which dealt with the development of soils of various types in the Wairarapa, was one that demanded a good deal of thought and knowledge on the part of competitors, who are to be congratulated on the general excellence of their efforts.

We are indebted to Sir William Perry for his interest in the contest, and for his donation of three prizes, £2, £1, and 10s. The awards were: A. Cruickshank, Masterton, 1; M. Knutson, Carterton, 2; D. McGregor, Masterton, 3; A. Heckler, Alfredton, 4.

The following is the first prize essay:—

"The Development of the Flat Farming Lands of the Wairarapa."

By A. CRUICKSHANK, Masterton.

THE flat farming lands of the Wairarapa, being of a highly diversified nature, the development of each type is therefore an entirely different process. The many types are proved by the fact that all classes of farming are carried out in this district.

The first type of land to be considered is the heavy clay land. This type of land probably requires the most work to bring it into production, but when in production makes ideal dairying land. The thing of paramount importance is drainage. By efficient tile and mole draining the wettest of paddocks can be kept quite dry all the year round. Mole draining, done on a constant slope (to ensure the drains not scouring) will last from 15 up to 25 years, so compared to the price of tile draining all the paddocks it is well worth it.

The big rushes, if subsisting in any quantity, are best dug out and stacked in heaps where they can be burnt when dry. The smaller rushes can easily be turned in with a swamp plough. When the paddock has been worked down (after ploughing) a crop of rape could be sown, the comparatively heavy stocking which the rape could take would be beneficial to the soil. The next spring grass could be sown down. The following would be a very suitable mixture: Perennial rye, 30lb; sub. clover, 11b; Montgomery red clover, 2lb; white clover, 4lb; crested dogstail, 2lb.

The next autumn a ton of burnt lime per acre should be applied. The grass will need careful management and any sign of "yellowness" in the pasture is a sign that the drains are not functioning properly. The soil will still be inclined to be acidy, so to turn it to an alkaline soil lime must be applied regularly. When this land is in production topdressing and winter grass harrowing is always a paying proposition.

The next type of land is the shingle and light clay loam. This type, if it had been neglected for a few years, would be growing a mixture of danthonia, browntop, and an occasional ryegrass plant.

The land should be ploughed in the spring before it gets too dry. One discing and harrowing should suffice to keep the weeds down and keep the moisture in till just before Christmas, when the paddock should be worked down preparatory to taking a crop of swedes. Between Christmas and New Year is quite early enough for swedes in the Wairarapa, as the plants

have too much leaf on when the usual dry spell comes, when sown earlier.

The comparatively heavy stocking during the winter will improve the nitrogen content of the soil.

In the spring after a fairly early ploughing the paddock should be got ready for the grass mixture as follows:—Perennial rye, 30lb; sub. clover, 4lb; crested dogstail, 2lb.

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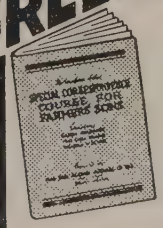

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It must be stressed that cheap seeds are the dearest in the long run. The certified seeds which are for sale to-day are tested for germination and purity. The extra money spent on the best seed is many times repaid in later years.

Subterranean clover is the clover which has increased the carrying capacity of light ground tremendously. It comes away in the spring and for six months provides an abundance of feed. It seeds about November and then when the autumn rains come it germinates. Although not growing so speedily as in the spring, it provides a moderate amount of feed well into the winter when it lies dormant till the spring.

The Mount Barker strain seems to be best suited to Wairarapa conditions. These light loam and shingly soils usually have a low carrying capacity. If the soil could be increased in fertility the carrying capacity could be improved a great deal. It is very noticeable where a temporary sheep yard has been put up on a second-class pasture. The droppings from the stock, concentrated on a small area, benefits the pasture materially. That is why sub. clover is so valuable on light class land. The sub. grows and besides providing feed for a heavy carrying capacity (the heavy stocking building up the soil), it in turn, being a legume, returns nitrogren to the soil. Of course, liming must be carried out regularly, besides keeping the ground sweet, it also improves the bone of stock grazing on it.

The third type to consider is the deep loamy river flats. It is a very valuable type as it does not burn up in the driest of summers and provides feed when it is scarcest.

Before being developed this type of land was probably covered with "cutty" grass. The level of the ground is probably fairly rough and if so would be better ploughed with a swamp plough. The land is usually full of weed seeds which, when turned to the light, germinate. It is, therefore, advisable to cultivate and leave it then cultivate again until the land is reasonably clean of weeds. On this type of land any winter crop could be sown, swedes would be very suitable. About 12oz per acre would be quite enough seed.

Next spring rape and grass would be a good crop to sow. A seed mixture of the following would be suitable:—Perennial rye, 30lb; white clover, 4lb; sub. clover, 2lb; cowgrass, 2lb.

Liming in the autumn has a marked improvement on the grass.

The fourth type of land to consider is the bush-cleared land which has been burnt. The land growing bush is generally very fertile, as scrub takes charge of the infertile land. It is

therefore well worth stumping. When stumped and ploughed the paddock would need to lie fallow for a while, as nothing but weeds would grow where it had been burnt if the ground was cultivated. When worked up it should be left for a while while the weeds germinate and then cultivated again till the ground is reasonably clean. A crop of kale could be sown which would provide good feed for hoggets.

The following spring, after ploughing, peas and grass would be a good crop to sow, as peas return nitrogen to the ground.

Depending on whether the ground was light clay or more inclined to be a heavy clay the following grass mixture would suffice:—Rye, 30lb; Montgomery red clover, 4lb; white clover, 4lb; dogstail, 2lb.

If the land is light clay, 4lb of sub. clover could be substituted for the Montgomery red clover.

In conclusion, it must be said that all grasses must be looked after and harrowed when they appear to be getting tufty and weedy, especially if cattle are running on them. The light land, always the first to dry up in the dry spell, will not be so apt to do so if a good sole of grass is kept on them till well after Christmas to protect the actual grass "crown" from the sun.

Rongotea Field Day

By G. PEARSON,
Hon. Secretary, Rongotea Y.F.C.

THE Rongotea Y.F.C. held a successful field day recently on the property of Mr. J. C. Gibbons, Carnarvon. In spite of unfavourable weather conditions there was a good attendance of members. Shearing tuition was carried out all day under the capable guidance of Mr. H. Voss. Sixteen members participated, practically all of them being beginners.

Judging in the various classes was carried out, and the results and judges were as follows:—

Dairy Cattle (Mr. H. Mai, Glen Oroua).—R. Hill, 1; D. Lind, 2.

Romney Sheep (N. P. Nielsen, Kairanga).—R. Gloyn, 1; J. Gibbons, 2; J. Gloyn and R. Hill, 3, equal.

Southdowns (Mr. Mumford, Shannon).—R. Gloyn, 1; J. Gibbon, 2; J. Gloyn, 3.

Baconer Pigs (Mr. Johnson, Palmerston North).—J. P. Gloyn, 1; H. Hunt, 2; M. Lind, 3.

Among those present were the President and Secretary of the Rongotea Branch of the N.Z. Farmers' Union (Messrs. L. Burne and J. C. Gibbons), Mr. H. de O. Chamberlain, district Y.F.C. Secretary, and Mr. W. J. Croucher, Palmerston North.

Among the Clubs: Reports on Activities

Western Southland.

Woodlands.—Report on club's dance presented. The possibility of shearing classes being held was fully discussed. Mr. Thomas, of the Otago Farmers' Union Mutual Fire Insurance, Ltd., was the speaker for the evening.

Eastern Southland.

Balfour.—Accepted Gore A. and P. Association's invitation for club members to act as stewards at the forthcoming show. The speaker for the evening, Mr. G. R. Herron, gave a talk on "The Future Activities of Young Farmers' Clubs." Mr. Herron also showed several films on "Farming in Southland."

Crookston.—General. Mr. R. G. Buchan, Department of Agriculture, spoke on "The Meat Act," and answered numerous questions on the subject put to him by the meeting. The W.D.F.U. supplied supper at the conclusion of the evening's programme.

Five Rivers.—General business. Talks were given by members. At a previously unreported meeting Mr. D. M. Mallock spoke on "Farm Accountancy," and Mr. A. Lange gave an interesting account of his travels abroad.

Otama.—General business. A talk on "The Production of Swede Seed" was given by Mr. W. Faithful, Department of Agriculture. This speaker also covered a few points on general farming topics.

South Otago.

Clinton.—General. Mr. Stewart, Chairman of the South Otago District Committee, lectured on "The Y.F.C.'s Part in the War Effort." A talk was given on "Wool Classing" by Mr. J. Dodds, Warepa. Mr. Dodds brought with him a number of samples of wool, and used these to illustrate points in his address.

Clutha Valley.—The debate set down for this meeting was postponed to a later date, the evening being spent on impromptu speeches from several members.

Warepa.—Short course at Lincoln College discussed. The speaker for the evening, Mr. W. F. Ashman, spoke on "Asphyxia." At the conclusion of the address all members present attempted practical demonstrations of artificial respiration.

Central Otago.

Roxburgh.—General. One new member enrolled. General discussion took place on various farming topics.

Dunedin.

Palmerston.—General. A talk on "Beekeeping" was given by D. Clearwater, a club member.

West Taieri.—An inter-club debate held recently was won by the South Taieri Club by the narrow margin of nine points. Mr. A. Salmond, of Dunedin, addressed the meeting on "Architecture."

North Otago.

Enfield.—General club business. Mr. C. J. Cowan gave a talk on "Dairy Farming in the Early Days." This lecture was followed by a general discussion on "Present Day Farming," in which both the members and Mr. Cowan took part.

Five Forks.—Mr. B. B. Blackmore demonstrated to the meeting various types of common weeds.

South Canterbury.

Cannington-Cave.—Field day to be held. Mr. E. J. Robertson, Department of Agriculture, lectured on "The Stock Acts," and Mr. Baker gave a short address on "The Home Guard."

Geraldine.—Arrangements for club dance. Proposed shearing course discussed. A talk on "Lucerne" and a sound film on the same topic were given by Mr. C. C. Leitch, Department of Agriculture. A field day was held recently, when some 20 members visited the Temuka P.W.D., where the Machinery Department and Research Laboratory were inspected under the supervision of Mr. Todd, the district engineer. The party was also shown movie films depicting various public works machines.

Milford.—An open meeting was held. Mr. S. Freeman, Dominion Organising Secretary, showed a number of talkie films, and addressed the meeting on "The Policy of the Young Farmers' Clubs during the War Period."

Mid-Canterbury.

Hinds.—General. Mr. H. C. B. Withell addressed the meeting on "The Points to Look for in Judging Sheep."

Methven.—General. An interesting talk was given by Mr. Colin How, of the N.Z. Dairy Board, on "The Government Dairy Herd Improvement Plan."

Christchurch.

Darfield.—The sum of £25 13s. 2d. was realised from the recent annual club ball. Of this, £12 12s. was handed to the local Red Cross Society. Arranged to hold a barn dance in November to raise funds for Patriotic purposes.

Ellesmere.—General. An address was given by the Rev. Mr. McMaster on "Places I have seen and People I have met."

Springston.—Arrangements for field day. Dr. Weston, of Canterbury Agricultural College, Lincoln, spoke on "Farm Accountancy."

North Canterbury.

Amuri.—General. Films were shown on "Caterpillar Tractors" by Mr. J. Buckley, representing Gough, Gough, and Hamer.

Scargill-Omihi.—It was decided that members endeavour to arouse interest in checking of the nasella tussock which is likely to become a menace if allowed to spread. Impromptu speeches by members.

Wairarapa.

Alfredton.—The following debating team was selected to represent this club against Carterton Y.F.C.:—J. Shirtcliffe, A. Heckler, and S. Ross. General discussion took place on various agricultural topics. At a previous meeting a debate was held with the Masterton Club, and Alfredton were declared the winners by 295 points to 291. Mr. P. Page, Eketahuna, was the adjudicator.

Horowhenua.

Otaki Te Horo.—General discussion on various farming topics and also on "The Home Guard."

Shannon.—Business meeting.

Manawatu.

Apiti.—Shearing and stock judging competitions discussed. The speaker for the evening was Mr. C. J. Hamblyn, Department of Agriculture, his subject being "Silage Making."

Bunnythorpe.—General. Films of agricultural interest were exhibited by Mr. H. de O. Chamberlain, Department of Agriculture. At a previous meeting R. C. Clevely, a club member, spoke on "My Recent Australian Trip."

Colyton.—Field day held on Mr. R. Linklater's property. Messrs. L. Thomas, J. Humphrey, and J. Lind gave demonstrations of shearing.

Feilding.—Team selected for Manawatu Stock Judging Competitions. Two teams nominated for the Jersey Cattle Breeders' Club's Judging Competition. Team entered for Wellington Council's Shearing Competition. Club's annual dinner to be held. Club debate, "That Country Life is Preferable to Town Life," was won by the negative.

Kairanga.—General. Mr. H. de O. Chamberlain, Department of Agriculture, gave lantern lectures on "Sugar Beet," "Fordson Tractors," and "Pig Development."

Kimbolton Kiwitea.—Shearing day to be held. A talk entitled "The Future Policy of Grassland Farming" was given by Mr. C. J. Hamblyn, Department of Agriculture.

Opiki.—Club to donate 10s to District Committee funds. Mr. V. Lewis, Chairman of District Committee, spoke on "Club Activities."

Oroua Downs.—General business. Mr. J. Gloyn, Rongotea, gave a lecture on "Potatoes." At a previous meeting an interesting address on "Mammitis and Abortion in Dairy Stock" was give by Mr. R. P. Gilder, Department of Agriculture.

Pohangina Valley.—A lecture was given by Mr. J. Hill Motion, B.Sc., M.R.C.V.S., on "Animal Diseases and Their Control." He also discussed with members various common stock complaints. At a previous meeting Mr. H. de O. Chamberlain, Department of Agriculture, gave a talk entitled "Crops and Cropping." A field day was held at Messrs. Moar Bros.' property. There was an attendance of 52, half of whom were members of the general public. The demonstrations included "Preparing a Wool Clip for War Time Conditions" (Mr. R. Mowatt, Wool Expert of N.Z. Loan and Mercantile Co.), "Shearing and Shearing Gear" (A. Roberts), "Shearing" (R. and V. Smart).

Waituna.—General business. Club debate held, the subject being "That Modern Science is a Menace to Humanity."

Whakarongo.—Cup donated by Mr. R. G. Scott, Advisory President, as a trophy for stock judging at the coming field day. Two teams entered in Jersey Cow Stock Judging Competition at Manawatu Spring Show. A talk was given by Mr. L. Burton on "Electric Fencing."

Wanganui.

Bulls.—Selection of team for stock judging competitions. An address was given by Mr. R. Mackay, solicitor, on "The Land Transfer and Fencing Acts." At a previous meeting a talk entitled "Increased Production through Disease Control" was given by Mr. J. Hill Motion, M.R.C.V.S.

Mangaweka.—Arrangements for the collection of scrap metal. Donation of £2 1s. to Red Cross Fund. Informal social evening held.

Taihape.—Business meeting.

South Taranaki.

Eltham.—General business. Roll of Honour to be kept. New secretary appointed in place of original secretary now on military service.

Hawera.—The sum of £4 was donated to the Patriotic Funds. Mr. S. Freeman, Dominion Organising Secretary, and Flying Officer E. W. Barnett, Dominion President, spoke on "The Y.F.C. Movement," and Mr. Freeman then exhibited a number of talkie films on agricultural subjects.

Kaponga.—General. Euchre tournament held, the winner being N. Platt.

Central Taranaki.

Cardiff.—Entered four teams for pig judging competitions at Stratford Show. Mr. T. Brunton spoke on "Farming in the Waikato." A short debate on "Cow Shed Management" was also held.

Pukengahu.—General business. Mr. G. A. Blake, Department of Agriculture, addressed the meeting on 'The Pageant to be Staged by Y.F. Clubs at the Stratford A. and P. Show."

Toko.—Euchre party and dance arranged. Mr. H. Kyle, Huinga, lectured on "The Judging of a Jersey Cow." Three new members were enrolled. Mr. G. A. Blake, Department of Agriculture, gave a talk on "Cropping."

North Taranaki.

Hillsborough-Tarurutangi.—Mr. J. Sorensen, Supervisor, Taranaki District Pig Council, gave an address on "Pig Husbandry," in which he covered such phases as the development of the industry, the planning of pig layout, and breeding and management.

Inglewood.—General. The sum of £10 10s. was raised from a Patriotic Dance held recently.

Karawaka.—One new member elected. A talk entitled "The Selection of a Herd Sire" was given by Mr. F. L. Knowles, consulting officer of the Herd Improvement Association.

Mangorei.—General business. Mr. V. C. Davies, of Messrs. Duncan and Davies, New Plymouth, lectured on "The Ideal Way to Plant and Lay out Shelter Belts on a Farm."

Southern Hawke's Bay.

Ballance.—Shearing classes to be held. A talk was given by Mr. F. J. S. Holden, Department of Agriculture, on "How to Increase Primary Production."

Mangatainoka.—Dance to be held in aid of Aeroplane Fund. An interesting debate was held with the Woodville Club, "That the Best Nett Returns are obtained by Eliminating the Plough." Woodville won by 363 points to 336.

Woodville.—Discussions held on collection of waste metals, stock judging at Palmerston North Show, and shearing competitions at Feilding.

Central Hawke's Bay.

Hastings.—Report on club dance. Arrangements for debate with Wairoa Y.F.C. Impromptu speeches.

Takapau.—Field day held in Mr. De Stacpoole's woolshed. Mr. A. S. Aldrich, jun., gave a demonstration of "How to Shear a Sheep," and Mr. W. Asher demonstrated "Skirting and Classing a Fleece."

Northern Hawke's Bay.

Meeanee.—General business. Mr. S. Freeman, Dominion Organising Secretary, addressed the meeting on "The Work of the Y.F.C. Movement."

Nuhaka.—General. Mr. R. P. Hill, Department of Agriculture, spoke on "Sugar Beet and its Value as a Stock Food."

Te Kuiti.

Mokauiti.—General. Talks were given by club members as follows:—"Rearing of Calves" (B. Blundell), "Mammitis" (B. Riley), "Shelter Trees" (N. Aldridge), 'The Sheep Shearing Course at Ruakura" (J. N. Law). At a previous meeting Mr. H. Woodyear Smith spoke on the following subjects, which he illustrated by films:—"Wheat to Bread," "Captured Sunshine," "Root Crops," "Australia and the Farming Community." The following talks were also given:—"Clearing of Swamp" (D. Law), "Shelter Trees" (P. Alcock), and "Bridges and Culverts" (D. Kirk).

Otorohanga.—Club debate held, the subject being: "That Sheep Farming in New Zealand is Better than Dairy Farming." D. Robertson, A. Horneman, J. Mark, and J. McDowell took the affirmative, and H. Murphy, D. Brightwell, M. Shields, and P. Evans spoke for the negative. The latter team gained the decision. At a previous meeting Mr. H. Woodyear Smith showed a number of moving pictures. The club also held a dance recently.

Eastern Bay of Plenty.

Edgecumbe.—General. Impromptu debate on the subject that "In the Achievement of Happiness, Apart from Material Gain, the Worker on the Land has much Greater Prospects than his City Friend."

Waimana.—Arrangements for club's fourth birthday and for a land valuing field day. Debate held, "That Town Life is Better than Country Life." The negative team, consisting of J. Cranswick, B. White, D. Woolfield, and D. White, gained 340 points as against 328 points by the affirmative side, P. Clark, D. Cain, T. Savage, and R. Sinclair. Mr. L. Macdonald acted as judge.

Western Bay of Plenty.

Te Puna.—General business. Mr. Washer showed a number of films on "Travel."

Te Puke.—Three new members enrolled. Lecture by Mr. J. R. Reenberg, Supervisor of Pig Clubs, on "Pig Raising in Denmark."

Waikato.

Cambridge.—Decided to donate £3 10s. 6d. to "London Air Raid Relief Fund." Debate that "New Zealand should Support its Secondary Industries." Affirmative speakers, A. Gascoigne and R. Giles; negative, F. Turkington and F. Searle.

Tahuna.—Business meeting.

Auckland.

Clevedon.—Team selected for inter-club debate. A club debate was held, "Cropping v. Non-cropping." Mr. J. E. Bell, Department of Agriculture, acted as adjudicator, and gave his decision as a draw.

Harrisville.—General. Mr. H. Woodyear Smith acted as adjudicator in the club debate, "The Young Farmer of Today has Greater Opportunities than His Grandfather." The negative team won.

Hunua.—Arrangements for baconer pig competition.

Warkworth.

Kaukapakapa.—General business. Mr. P. S. Syme, Department of Agriculture, gave a talk on "Pastures for Production."

Whangarei.

Maungatapere.—General. Talk, "Spring Diseases in Stock," by Mr. T. H. Hankin, Department of Agriculture.

Dargaville.

Arapohue.—A lantern lecture was given by Mr. E. H. Arnold, Department of Agriculture, on "Breaking in and Grassing Virgin North Land." At a previous meeting prepared speeches were heard, for which Mr. Mazengarb, of Dargaville, donated 10s. as prize money. The subject was, "How Members of Young Farmers' Clubs can aid Primary Production." Mr. C. H. King acted as judge, and awarded his decision to N. A. Vallance and S. F. Beckers.

Kaitaia.

Oruru.—General. Mr. Frew read a lecture which he had attended at Ruakura College on "Farm Management."

Health Notes for the Farm

Contributed by the Department of Health

Health During the Adolescent Stage

Not infrequently a parent is heard to say, "Now that my child is 15 years old I should like to make some study of adolescence." The fact is that inly a minimum of advantage is to be gained by such study when the offspring has already reached adolescence. The maximum gain is to be achieved when adolescence is foreseen in the rearing of the infant and the child.

—L. S. HOLLINGWORTH.

THE mismanagement of health during adolescence often spells suffering, unhappiness, and disappointment which may throw a shadow over the whole subsequent life. A new world of thought and emotion is opening up before the mind during this period. The physical and mental foundations for adult life is being laid; mental, bodily, and sexual changes are taking place.

It is a period of momentous importance for health and happiness in future life, for the risks to body and mind are very great indeed. It is a critical time when unhygienic methods of living may easily produce disastrous results. One physician states that it is counted by medical men a fearful risk to run, not merely that actual disease should be brought on, but that a girl capable of being developed into a healthy, useful, good, and happy woman if Nature's laws are obeyed should by unhygienic conditions or misdirected education grow into a maimed and distorted and therefore unhappy woman who cannot get out of life—she has only to live once—all that it is capable of yielding. No requirements, no knowledge, no intellectual pleasure can possibly make up her health in her later life. There is an organic happiness that goes with the harmoniously constituted body and mind. Cheerfulness is one of the best outward signs of this health, and what man, especially what woman, has not missed his vocation in the world who is not cheerful.

Now let us consider some of the essentials from a health standpoint to assist the adolescent during this momentous period. Proper diet, exercise, adequate rest, and steady occupation all point towards the right solution in keeping up the general health and the proper development of strong, healthy bodies.

IF—

If you can keep your health when all about you
Are losing theirs and blaming it on age;
If you do all the things you know you ought to,
Then you don't need to wander down the page.

If you can hike and swim and fish and paddle
And conquer some big job from day to day;
If you can pitch a tent and pack a saddle,
You know it's health makes life and work all play.

If you can have a plain and balanced diet;
Know sun and water can't be had too much;
It's free; don't fool yourself and try to buy it.
Good health put on "the skin you love to touch."

If you can sleep all night with windows open
And walk ten miles without an ache or pain;
You'll find you need no pills or other dope'n;
You'll live long years to do it oft again.

If you can curb the vain desire to hurry
And calmly walk while others madly run;
Go slow, keep cool, relax, let others worry,
Then you'll be going strong when they are done.

If you can make health rules your daily habit
And yet don't let them be your only aim;
To live life to the full those years you have it
Is better far than wealth or fame.

Diet

The great incentive to work is the need for food. Without it, neither man nor nation can live. As an engine requires a steady supply of fuel, so the human body needs fuel in the form of food to be converted into several forms of energy, such as heart and muscular energy. In addition, a special type of food is needed for building up new body tissues so that growth may occur. Rapidly-growing youth needs food both for its fuel value and for purposes of worn-out tissues. It seems to be a general principle of biology that the younger the cell the greater is the power of oxidising and breaking down food, and the older it is the less of this power does it possess.

In accordance with this principle the assimilation powers of a child are greater than those of an adult. The child, therefore, relatively to its weight will require the greater amount of food. As to the amount of food required by the adolescent boy or girl, some authorities even go so far as to say that the intake at this period of life should be greater than that of a full-grown man doing moderate work. It is, therefore, a good sign to see a young person with a hearty appetite.

It might be stated that the dietetic requirements of middle and old age are just the reverse. The assimilative power of the cells is on the wane and the bodily activities are restricted, hence less food is required. The danger of overfeeding the old is almost as great as that of underfeeding the young; an excess of nourishment chokes instead of feeding the flickering flame of life. Leanness and longevity, it has been remarked, go together, and a man will only roll all the faster down the hill of life if his figure is rotund. It can be generally stated that the diet of the adolescent should include ample milk, eggs, butter,

wholesome bread, green vegetables, fruit, a moderate amount of meat, bacon, and, if possible, fish.

Sound nutrition is the bedrock of health. Further information on this matter appears in the booklet "Good Nutrition," published under the auspices of the Department of Health and edited by Dr. Muriel Bell, of the Nutrition Committee of the Medical Research Council. Copies of this publication are procurable from booksellers throughou the Dominion.

Exercise

Food alone is not sufficient to keep the body strong and well. We need in addition regular exercise and fresh air to develop our muscles and keep us healthy. For the adolescent the beneficial effects of games extend far beyond the development of balance and alertness, for they are also a great feature in building character, teaching the spirit of "give" and "take," the ability to take a rebuff smilingly and a win without undue elation. Parents, therefore, should encourage their children during the adolescent stage to love the open-air life, to take part and interest in games; by seeking recreation, for instance, in cricket, football, basketball, tramping, and so forth. Such organisations as Girl Guides and the Boy Scouts are among many examples of excellent avenues of training and recreation and social service.

We have only to compare the pale faces and frail forms of children who are coddled behind closed windows and doors with the ruddy faces and sturdy forms of those who play outside to see the advantage of outdoor recreation. In life a good carriage and a flexible, well-shaped body are possessions of great value to the young person preparing to earn his living. Well-planned leisure promotes physical and mental fitness. Physical laziness and inactivity, spending too much time in a stuffy atmosphere, weaken the body and undermine the health and vitality and contribute to disease.

Add to the habit of reasonable exercise a knowledge of the every-day laws of health, sufficient rest to ensure growth, an adequate and suitable food supply, and some congenial hobby, and the young person is equipped with weapons which will stand him in good stead in his future struggle with occupational fatigue.

The Mind

Health of the mind is important. The duty of mental fitness is urged, because this will make the young persons more useful in the world, better able to help others, and equipped to undertake work and occupations suitable to them. Without sound mental development there can be no enduring bodily health or freedom from fatigue, nor yet a healthy outlook on life.

System, order, and punctuality should be the rule of their lives. Faulty training and unfavourable environmental conditions cause a good deal of mental disorder in youth. They should be allowed to develop naturally and normally with consistent and thoughtful direction. Concord in the home ensures to children an infinitely better chance of growing up stable individuals A wise ambition and social service adds zest to life and banishes monotony and boredom.

Then, too, parents who impart a healthy understanding to the growing boy or girl of the significance of the natural functions of the body perform an essential duty of great importance. The parents should be the first people, not the last, to whom young people should turn for any help or information about the problems of their emotional life. The parent who has helped his child establish good habits of eating, sleeping, elimination, cleanliness, posture, and exercise, a wholesome knowledge of his body, and a healthy mind in early childhood needs only to impress upon the adolescent the importance of continuing the fundamental principles of physical and mental hygiene in order to maintain a healthy and efficient body during this or any other period of life.

"It is with us as with timber," wrote Rudyard Kipling. "Every knot and shake in the board reveals some disease or injury that overtook the log when it was growing. A gentleman named Jean Pigeon who once built a frame house for me put this in a nutshell. He said: 'Everything which a tree has experienced in the forest she takes with her into the house.' This is the law for us all, each in his or her own land."

Apiary Notes—*Continued from page 456*

moisture has not been removed by the bees.

Added Moisture

Added moisture can occur in a number of ways:—

(1) Taking honey during wet weather under conditions that do not allow the supers and combs to be kept dry; also, extracting under similar conditions.

(2) The storage of full combs for any length of time during wet weather, before extracting the honey. Uncapped honey or honey drainings from the broken burr combs attracts a considerable amount of moisture if left exposed, and may later cause trouble.

(3) Leaking tubes used in connection with steam-heated uncapping knives, and leaving extracted honey exposed to a damp atmosphere in the honey tanks or at any time after the cappings have been removed.

Air Bubbles

While it is important for bee-keepers to give greater attention to straining and clarifying, it is also important to see that correct methods are used. In some districts during hot midsummer weather it may not be found necessary to strain freshly-extracted honey.

Warm temperatures may render the honey sufficiently mobile to allow all impurities to rise to the surface to be removed in the ordinary way, but normally it is necessary to strain all honey thoroughly before packing. This is best accomplished as the honey enters the holding tanks.

As honey passes through a strainer it is broken up into thin streams or threads. These thin streams become tiny drops shortly after leaving the strainer, especially if the honey has not been warmed, and, if allowed to fall a great distance, will cause air bubbles to be incorporated in the honey. According to the nature of the honey, these air bubbles are not always released. They invariably carry contamination, which later becomes apparent in stored honey.

The remedy is to baffle the honey as it leaves the strainer. Instead of allowing it to continue its course direct to the surface below, it should be caught by a metal plate or board placed close up and directly beneath the strainer. In this way the honey is diverted to the side of the tank and allowed to flow gently down, thus avoiding the admittance of air. These precautions are necessary where honey has to be kept in storage for long periods because of the time-lag between production and consumption of the total crop.

Further honey-packing problems will be dealt with in next month's apiary notes.

—T. S. WINTER, Senior Apiary Instructor, Wellington.

The Farm Home and Kitchen

Contributed by the Association for Country Education

The Second Christmas Of the War

THE appeal still comes to us from Britain—"Increase Production." We, whose work takes us so much among country women, feel we must pay tribute to you for your valiant efforts to help your fathers, husbands, or sons to respond to this appeal. We of the A.C.E. are glad and proud that we have been able to help you to some extent in the past, and we hope that next year you will let us help you even more.

The field of our work is limited by financial and other circumstances, so that in most parts of New Zealand we cannot bring a personal service to your very doors, but I should like you to know that so long as A.C.E. Headquarters remains in existence, every country woman who feels that we could help her with any home-making problem is more than welcome to write and lay her difficulty before us. I can promise that the letter will receive very careful thought, and will be answered to the best of our knowledge and ability.

In particular, I should welcome the opportunity to help women to solve problems of family nutrition, for it is quite certain that health, vigour, and efficiency are more dependent upon good nourishment than upon anything else.

None will realise better than you how these same things—health, vigour, and efficiency—are sapped by the long hours of hard work which productive farming demands of the farmer and his family.

So we feel that there is one thing, at least, which we could do to help increase production and the welfare of those engaged in doing it, and that is to help you to serve meals that will give more power to the arm, more clearness to the brain, and more courage to the hearts of those who are producing the food and wool that Britain needs.

On behalf of the entire A.C.E. Staff I have pleasure in wishing you, one and all, a successful season, a Happy Christmas, and a Victorious New Year.

VIOLET MACMILLAN, A.C.E.,
Organiser.

Ice Cream For All

ICE cream is one way of having the family take all the milk it needs—and like it. Ice creams are essentially very highly flavoured custards, mixed with whipped cream or gelatin to prevent the formation of ice crystals during the freezing. They must be highly flavoured, because the flavour is largely lost if the food is eaten in a frozen state.

When the custard mixture is frozen in an ice cream churn the constant beating keeps the texture smooth; thus, it is possible to make a smooth ice out of a very plain custard if it is to be churned as it freezes. Water ices or sherberts can thus be made, but when the ice cream is to be left to freeze in a refrigerator tray or packed in a mould in a salt and ice brine (a mousse) the mixture needs either much whipped cream or some gelatin to prevent the crystals from forming.

In the refrigerator it can be stirred occasionally to make it freeze more evenly and to break up the ice crystals, but, as this slows up the freezing, only a limited amount of stirring is desirable.

It is wise to mix the quite cold custard and whipped cream together very thoroughly to increase the smoothness of texture. One method of mixing is to pour the mixed cream and custard into a soda syphon, charge it with gas, and squirt it into the pans.

General directions and recipes for making various types of ice creams are given below:—

HINTS ON FREEZING ICE CREAM IN A REFRIGERATOR.

(1) Make sure the refrigerator is in good condition and the trays to be used are clean, thoroughly dry, and cold. Set the refrigerator at the lowest freezing temperature.

(2) Thoroughly cool the ice cream mixture before pouring it into freezing tray or trays. Fill them only about ⅔ full to allow for stirring. Place them in the freezing compartment. (Open the refrigerator doors as little as possible during freezing.)

(3) When the mixture is frozen about ¼ in. thick on sides and bottom, remove tray and stir well to mix. Return the tray and freeze about 20 minutes, then stir a second time. Freeze 20 minutes longer and stir a third (and last) time. Continue freezing.

(4) To add fruit, mix the pulped fruit into the mixture during the second stirring. Nuts, nougat chips, cocoanut, and grape nuts keep more crisp if added during the third stirring.

(5) After the mixture is frozen, set refrigerator at normal freezing temperature for 1 hour or more to ripen the ice cream. (But to store for several hours, keep the refrigerator at low freezing temperature.)

(6) Gelatin (½ teaspoon to 1 pint) is added to the less rich recipes frozen in a refrigerator to ensure a smooth texture.

PLAIN VANILLA ICE CREAM.
Rich Mixture.

2½ cups top milk (thin cream), 4 eggs, 1 cup sugar, 2 tablespoons cornflour (level), 1-8 teaspoon salt, 1 pint cream to whip, 3 tablespoons essence vanilla.

Method.—Scald milk and thicken with beaten yolks, sugar, and corn-

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serve them something really

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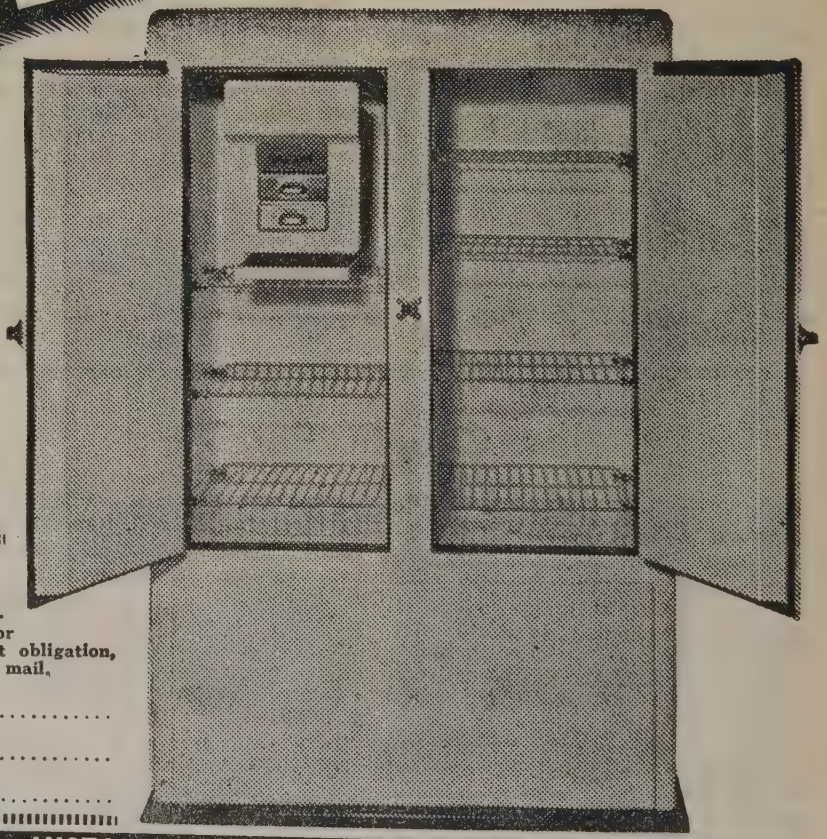

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flour. Stir well till mixture coats the spoon. Don't let boil. Cool. Beat white stiffly with salt and add to cooled custard and put in fast freezing tray and freeze till a mush. Take out and stir well, add stiffly beaten cream and vanilla, and put into fast freeze again and stir sometimes while freezing.

More Economical Mixture.

2 cups milk, ¾ cup sugar, 1 tablespoon flour (level), 2 egg yolks, ¼ teaspoon salt, 1 cup whipped cream, 1 teaspoon vanilla, 1 teaspoon gelatin, ¼ cup cold water.

Method.—Scald milk in double boiler. Mix sugar, flour, and salt. Add to milk and cook 15 minutes; then add beaten egg yolks and cook two minutes, stirring constantly. Add dissolved gelatin and mix thoroughly. Chill. Add vanilla and whipped cream. Be sure to mix custard mixture and whipped cream thoroughly. Unless this is done, the cream will not be smooth. Pour into refrigerator tray and freeze five to six hours.

VARIATIONS.

Peppermint Ice Cream.—Add four peppermint sticks to the hot milk above, and omit the sugar.

Tutti-Frutty Ice Cream.—To the ice cream when half frozen add 2 cups chopped fruit to 1 quart ice cream, e.g., sliced peaches, raspberries, canned mandarins, passion fruit, red and green cherries.

Ginger Ice Cream.—Add preserved ginger cut in small pieces.

Banana Ice Cream.—Mash three ripe bananas with a silver fork and add to half-frozen ice cream.

Peanut Brittle Ice Cream.—Finely crush ½ lb. peanut brittle. Mix in well with nearly frozen ice cream.

Chocolate Ice Cream.—Add two squares plain chocolate to milk to melt it before making custard.

Strawberry Ice Cream.—Mash strawberries to make one cup and add ¾ cup sugar, and stir into partly frozen mixture as described above.

Orange Ice Cream.—Omit vanilla, omit 1 cup milk, and add 1 cup orange juice just before freezing.

PINEAPPLE ICE CREAM.

Crushed pineapple and juice, 1 cup; sugar, 3-8 cup; lemon juice, 1 tablespoon; whipped cream, 1 cup; sugar, 3-8 cup; salt, 1-8 teaspoon.

Method.—Soak gelatin in cold water. Heat pineapple until boiling, add sugar, lemon juice, and soaked gelatin. Let cool and when beginning to thicken add whipped cream. Freeze.

COFFEE MOUSSE.

Gelatin, ½ teaspoon; water, 1 tablespoon; hot black coffee, ¼ cup; whipped cream, 1 cup; sugar, 3-8 cup; salt, 1-8 teaspoon.

Method.—Soften gelatin in the water. Dissolve in coffee. When cold fold into the whipped cream to which the sugar and salt are added. Put into trays and freeze without stirring.

Two A.C.E. Specials

FRUIT CAKE.

12 eggs, 1½lb. sugar, 1½lb. butter, 2lb. flour, 2 tablespoons orange juice, 2lb. sultanas, 2lb. currants, 1lb. mixed peel, ½lb. almonds, ½lb. cherries, ½ teaspoon soda, 1½ teaspoons each of vanilla, almond, lemon essence, grated rind of 1 orange.

Method. — Ordinary fruit cake method. Put in at 325 to 350 degrees for first half-hour, then put in pan of boiling water in bottom of oven and let drop to 250 degrees. Then cook for further four hours, the last hour on stored heat.

CASSEROLE FRUIT CAKE.

1 cup dried apricots, ¾ cup butter, 1 cup sugar, 4 eggs separated, 1 cup seedless raisins, 1-3 cup cherries, 1-3 cup sliced orange peel, 1-3 cup sliced citron, 1 teaspoon grated lemon rind, 2 cups flour, 1 teaspoon salt, ½ teaspoon soda, 1-3 cup almonds.

Method.—Cover apricots with water (cold). Bring to boil. Boil one minute. Drain. Slice coarsely. Then beat butter sugar, and egg yolks together till light; stir in raisins and fruit. Sift flour, salt, and soda. Add alternately with stiffly-beaten whites of eggs. Pour into well-greased 2-quart casserole, cover it. Bake in very slow oven (275 degrees Fahrenheit) two hours or longer, depending on thickness of loaf.

APRICOT MOUSSE.

Preserved apricots, 1 cup; sugar, ½ cup; cold water, 1 tablespoon; gelatin, 1 teaspoon; lemon juice, 2 tablespoons; cream, 1 cup (whipped).

Method.—Sieve the apricots and beat with the sugar until it dissolves. Soak the gelatin in cold water for five minutes. Add to the gelatin the lemon juice and then add this mixture to the hot apricots and sugar. Stir until all is thoroughly dissolved. Chill and when beginning to thicken fold in whipped cream. Pour into mould, pack in freezing mixture of ice and salt in proportion of 2 to 1, or freeze in refrigerator for about three hours. Note. —If dried apricots are used, to each cup of the cooked product allow an extra ½ cup of sugar.

SUNSET—HONEY AND FRUIT—MOUSSE.

Egg yolks, 2; cold water, ½ cup; gelatin, ½ tablespoon; honey or golden syrup, ¾ cup; whipped cream, 1 cup; lemon juice, ¼ cup; orange, ¼ cup.

Method.—Measure syrup (or honey) into saucepan and beat till boiling. Beat egg yolks, and stir in syrup very slowly. Return to saucepan and stir over heat till mixture thickens. Remove pan from fire, add gelatin which has been softened in cold water. Cool and when mixture begins to thicken, stir in whipped cream, lemon and orange juice. Freeze.

FROZEN BAVARIAN CREAM.

Fruit juice, ½ cup; lemon juice, ½ cup; sugar, 1-3 cup; gelatin, 1 teaspoon; cold water, 1 tablespoonful; eggs, 2.

Method.—Mix fruit juice, lemon juice, and sugar with the egg yolks. Cook slowly till mixture thickens. Remove from fire, add soaked gelatin and pour the mixture over stiffly beaten egg whites. Beat thoroughly and then freeze.

FROZEN PLUM PUDDING.

Currants, ¼ cup: seeded raisins, ¼ cup; finely shredded citron, ¼ cup; maraschino cherries (chopped), 12; shredded dates, 3 tablespoons; shredded figs, 3 tablespoons; maraschino cordial (brandy), ½ cup; blanched chopped almonds, 3 tablespoonfuls; chocolate ice cream, 1 quart.

Method.—Wash currants, add raisins, and steam or simmer in small amount of water five minutes or until plump; drain and cool. Marinate all other fruits in maraschino cordial six hours; combine fruits and nuts, and mix into ice cream. Turn into freezing trays of refrigerator and freeze two to four hours or until firm. Approximate yield: 3 pints.

Tasty Poultry Recipes

ROAST DUCK.

Choose a duck that is young and not too fat. Rub with salt inside and out, and stuff with a fruit or onion stuffing or with quartered tart apples.

Roast in uncovered pan, at 450 degrees for 20 to 25 minutes and at 300 to 325 degrees for balance of time, allowing 20 to 25 minutes per lb. for total roasting time. Baste at not less than 20-minute intervals.

DUCK WITH ORANGE SAUCE.

1 duck (5 lb.), 1 teaspoon salt, dash of pepper, 1 medium-sized onion (sliced), 1 large carrot (sliced), 1 stalk celery (sliced), 3 cups boiling water, ½ cup orange juice, 1 teaspoon lemon juice, 2 tablespoons port wine jelly, 1 tablespoonful flour, 2 tablespoons cold water, rind of 3 oranges, rind of 1 lemon, 1 navel orange (sliced).

Method.—Prepare duck for roasting, rub with salt and sprinkle with pepper. Place vegetables in roasting pan, lay duck on top and pour hot water in

pan. Roast as described above, allowing 20 to 25 minutes to the lb. When done, remove duck to hot platter and keep hot; strain liquid in pan, skim off fat, add fruit juices, jelly and flour mixed with water, and cook until thickened, stirring constantly. Cut orange and lemon rinds in narrow strips and cook in boiling water five minutes; strain, add rinds to sauce and cook about five minutes. Arrange orange slices around duck on platter and serve with sauce. Yield: five to six portions.

ROAST GOOSE.

Choose young goose, 8 to 10 lb. in weight; singe, clean, cut off neck at body, wash and dry. Rub inside with salt and outside with salt and pepper, and if desired a clove of garlic. Fill cavities loosely with celery stuffing or a fruit stuffing; sew cut surfaces, fold skin back over neck and fasten with skewer. Truss and place on roasting rack. Prick skin well with sharp fork, to let fat run out. Roast, uncovered, adding 1 cup of hot water after ½ hour of roasting; allow 20 to 25 minutes per lb. for roasting. Place on hot platter; garnish as desired, and serve with gravy made from 4 tablespoons each dripping and flour, and 2 cups giblet stock.

TO ROAST AN OLD FOWL.

Pluck, dress, and truss the fowl, put it into a saucepan of cold water, bring it to the boil; boil one hour and leave to cool overnight in the water. Next day stuff the bird and roast it in the usual manner (as described in the November "Journal").

FRIED CHICKEN.

Cut young chicken into pieces for frying (2 drumsticks, 2 thighs, 2 wings, 1 wishbone, 1 buttocks, 2 breast (split down breastbone), 2 backs (split down backbone). Note: Cut along ribs to separate breast pieces from back pieces. This can be done without first drawing the bird, as the entrails can easily be removed after each side of the bird has thus been split.

Wash and dry the pieces. Roll in seasoned flour and fry in butter, bacon, or pork fat, until well browned. Cover and cook slowly until tender, turning occasionally; allow half an hour for chicken of 1½ to 2½ lb.; ¾ hour for small fryers under 3 lb; 1 hour for fryers weighing more than 3 lb., adding ¼ cup hot water to browned chicken and cooking slowly. Serve with white sauce made by browning flour in the dripping in pan and adding rich milk or light cream. Allow at least a cup of sauce per person, and serve with hot scones, or boiled rice (and green peas).

SMOTHERED CHICKEN.

Brown young chicken as directed for fried chicken, then cover with light cream, bring to boil, turn into casserole and bake, covered, in moderate oven (50 degrees F.) for ½ to ¾ hour, or until tender. Serve from casserole.

JELLIED CHICKEN LOAF.

1 fowl (4 lb.) cut in pieces, 1½ quarts boiling water, 2 teaspoons salt, 1-8 teaspoon pepper, 1 carrot, 2 stalks celery, 1 small onion, 1 tablespoon gelatin, ¼ cup cold water.

Method.—Add fowl to hot water and cook till tender, adding seasonings and vegetables after first hour of cooking; remove meat, boil down stock to about two cups and strain through wet cheesecloth. Soften gelatin in cold water five minutes; add to hot stock, stirring until dissolved, then cool. Pick chicken from bones, chop fine, add to stock gelatin mixture and cool; when slightly thickened, turn into mould or loaf pan, chill until firm. When ready to serve, unmould on cold platter and garnish with parsley, cress, or radish roses as desired. Approximate yield: 1 loaf 9 x 5 x 3 inches, or eight portions.

Value of Wheat Germ Bread

EVERYONE with even the most elementary knowledge of what is needed in the way of food to maintain the health and well-being of the human body realises that there is a substance known as Vitamin B1 (or the Antineuritic Vitamin), which must be included in the diet.

Scientists have studied this vital substance to such an extent that they have been able to analyse and identify it as a white crystalline compound, having a very complex chemical formula, and containing both nitrogen and sulphur. A method has been evolved for measuring the amount of the vitamin in foods, and scientists now speak in terms of "International Units of Vitamin B1." Most agree that for health every person should have at least 300 International Units of Vitamin B1 per day, and it is known that the greater amount of total food eaten, the higher proportionately must be the amount of Vitamin B1 which is included in it.

The vitamin is found in small amounts in practically all foods, but these quantities are so small in the majority of foods (below 10 International Units per ounce) that unless one deliberately uses unrefined cereals and other good sources of the vitamin, one can easily go short of it even though one's diet may contain plenty of a wide variety of foods.

It has been proved by nutritionists and bio-chemists that chronic deficiency of the vitamin gives rise to any or all of the following conditions:—

Appetite becomes fickle, and the secretion of the digestive juices is impaired.

The muscles of stomach and intestines fail to function properly, and the results are certain types of constipation and intestinal stasis (lack of movement).

The nerves are affected, and certain types of nervous conditions develop.

Also, the body is not able satisfactorily to burn up the starch and sugar included in the diet to provide heat and energy.

To prevent deficiency it is therefore advisable to use regularly the foods which contain enough Vitamin B1 to make a real contribution to the diet. The best of these are:—

Wheat-germ, 150—190 I.U. per oz.
Wheat bran, 28—100 I.U. per oz.
Peanuts, 55—100 I.U. per oz.
Lean pork, 14—50 I.U. per oz.
Beef liver, 10—40 I.U. per oz.
Wholemeal bread, 25—35 I.U. per oz.
Green peas, 30—40 I.U. per oz.

Refined starches, fats, and sugars are all very lacking in the vitamin, yet these make up a large part of the diet of an active worker, who requires a great deal of total food and therefore a great deal of vitamin.

In the light of these facts and figures it is not difficult to see the importance of the discovery of how to incorporate wheat germ into flour for bread-making.

The use of the new wheat germ bread, in the quantities in which white bread is eaten by large numbers of people in this country, would go a long way towards giving protection against Vitamin B1 deficiency.

It is to be hoped that all housewives whose families habitually eat white bread will transfer to wheat germ bread, thus taking advantage of this opportunity to improve the diet without having to make any additional outlay.

HAS YOUR FAMILY TRIED IT?

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